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# THE AMERICAN ARCHITECT AND THE ARCHITECTURAL REVIEW

Keep

House at
Far Hills
N.J.

NEW HOUSING DEVELOPMENT BY METROPOLITAN LIFE INSURANCE COMPANY—THOMAS HASTINGS, R. I. B. A. ROYAL GOLD MEDALLIST, ADDRESSES OF PRESENTATION AND ACCEPTANCE—PART I, CARDBOARD MODELS—CONCLUDING A SERIES ON STAINED GLASS—NET SECTIONS OF RIVETED TENSION MEMBERS—DEPARTMENT OF SPECIFICATIONS—EDITORIAL COMMENT—COST DATA—ILLUSTRATIONS; A HOUSE IN NEW JERSEY BY CROSS & CROSS, ARCHITECTS—MISCELLANEOUS WORK BY MILLS, RHINES, BELLMAN & NORDHOFF—WORK BY WELLES BOSWORTH, ZIMMERMAN, SAXE & ZIMMERMAN, AND BROWN & VON BEREN

VOLUME CXXII AUGUST 2, 1922 NUMBER 2399

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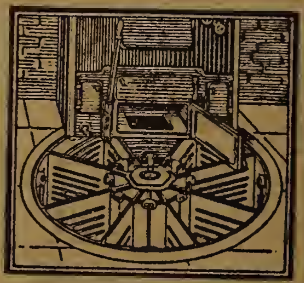
*The Cellar as clean as The rest of the house*



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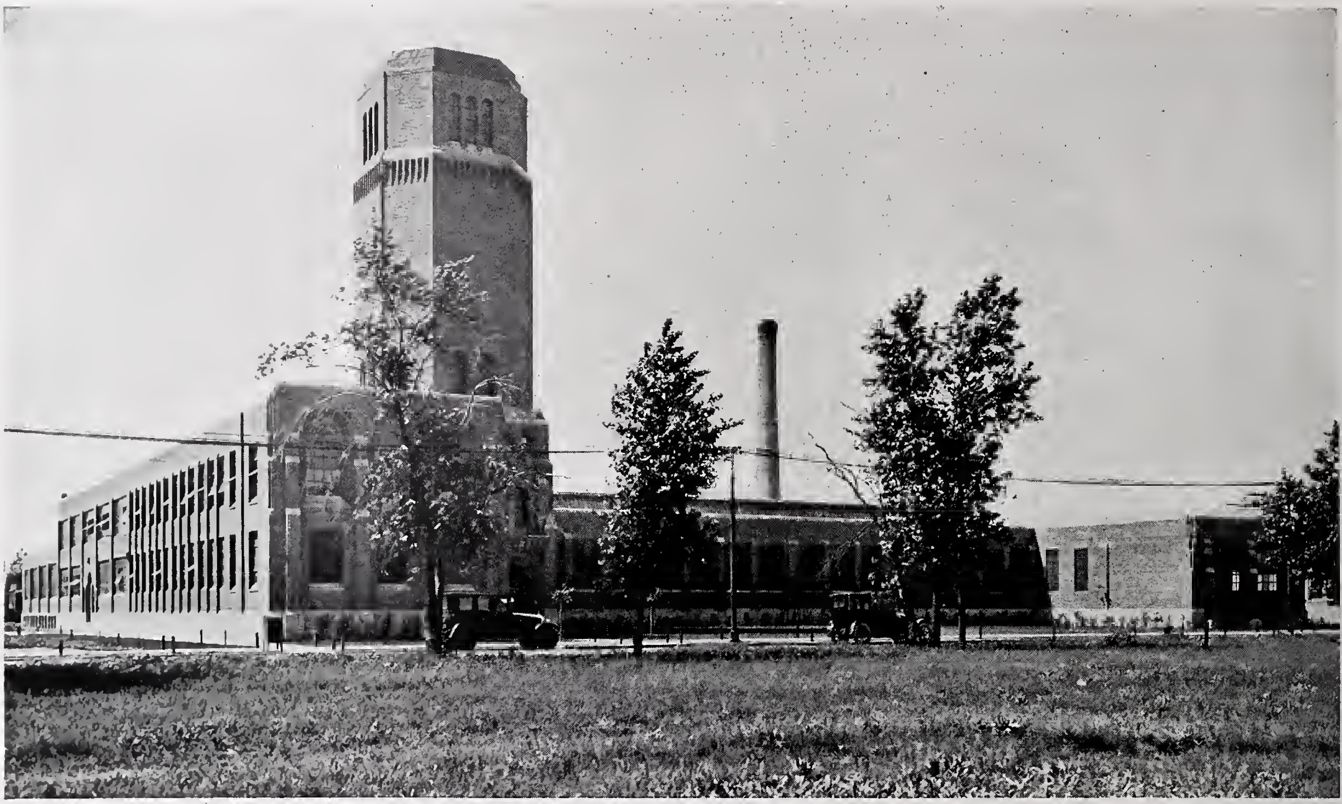

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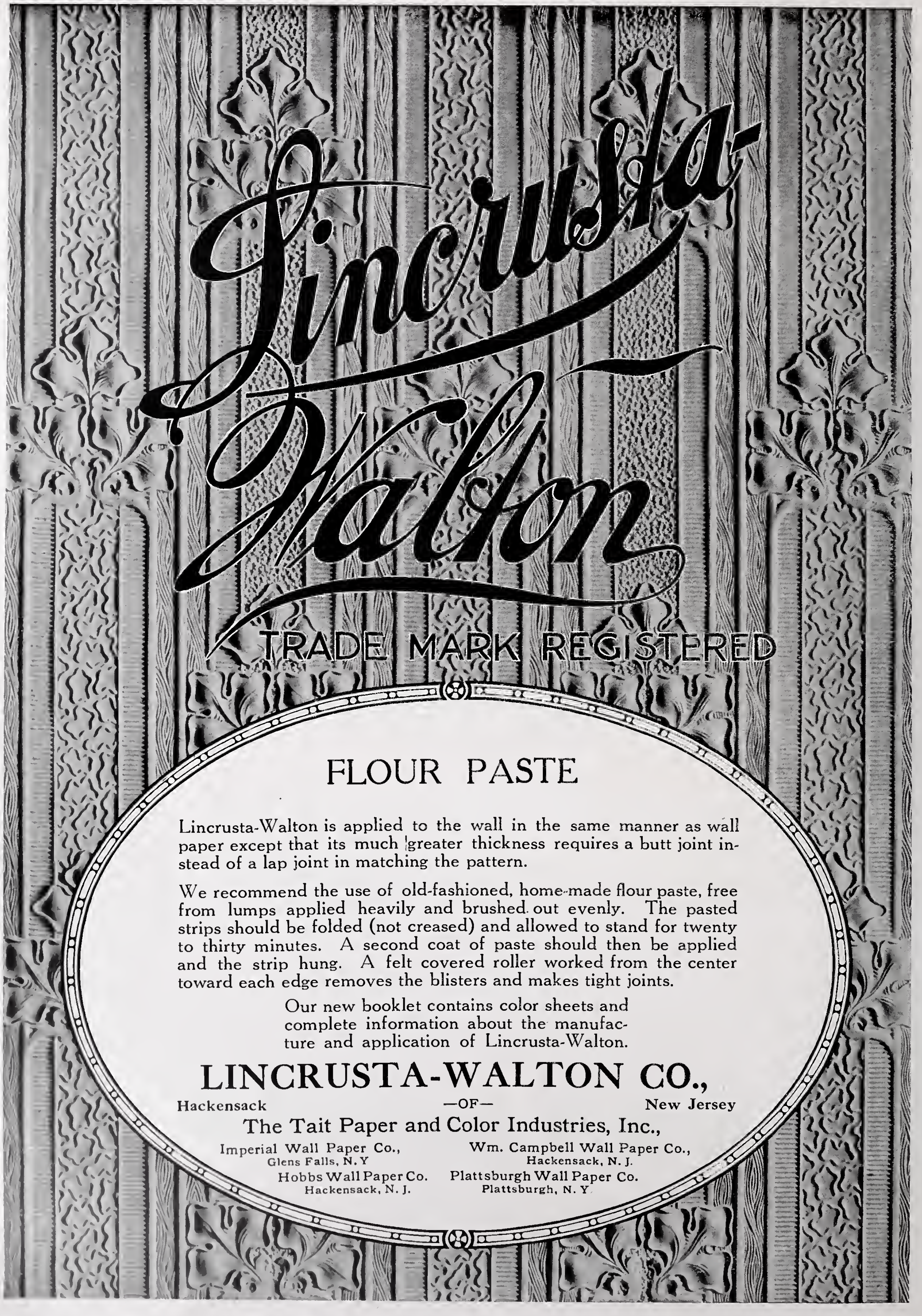

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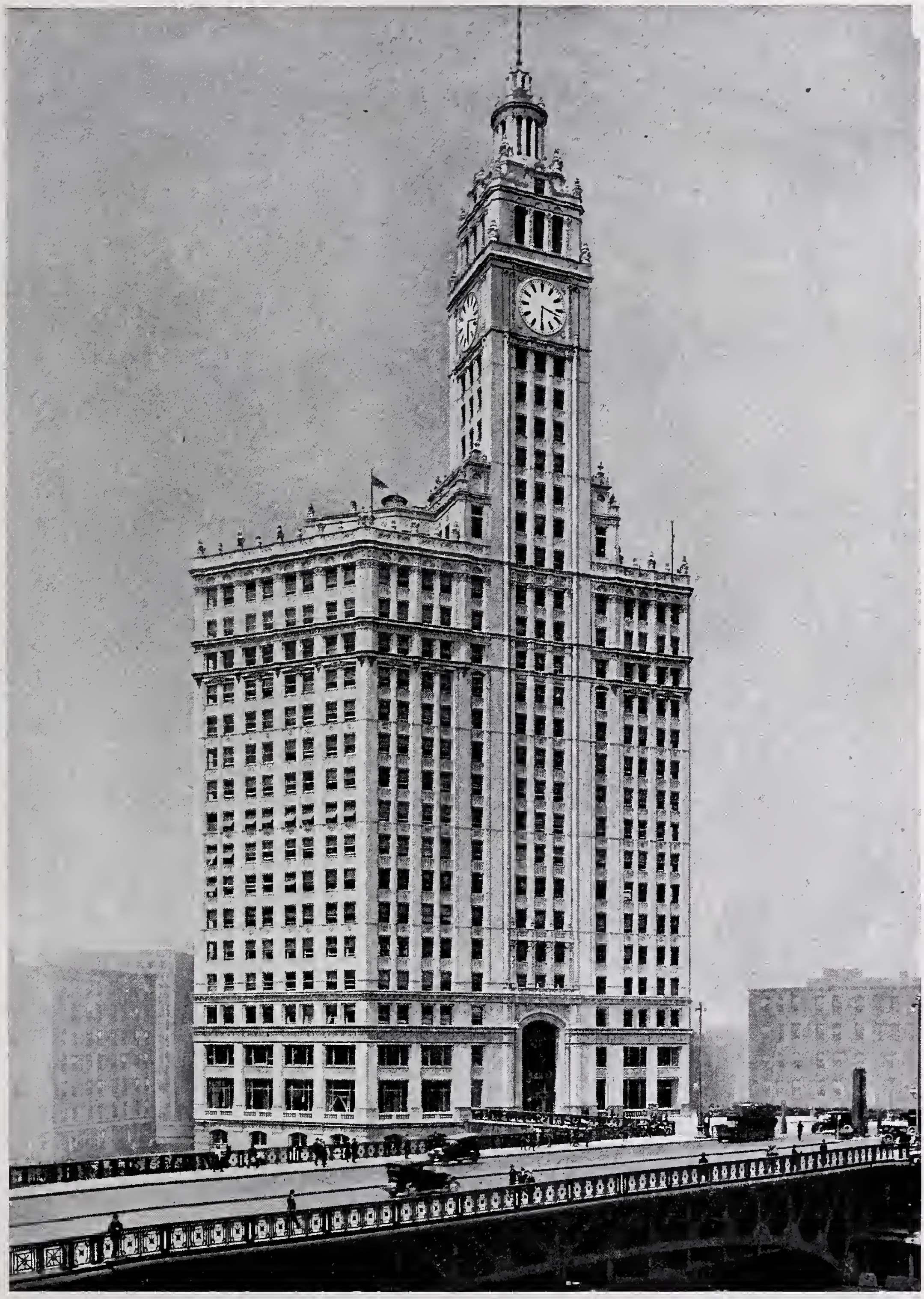

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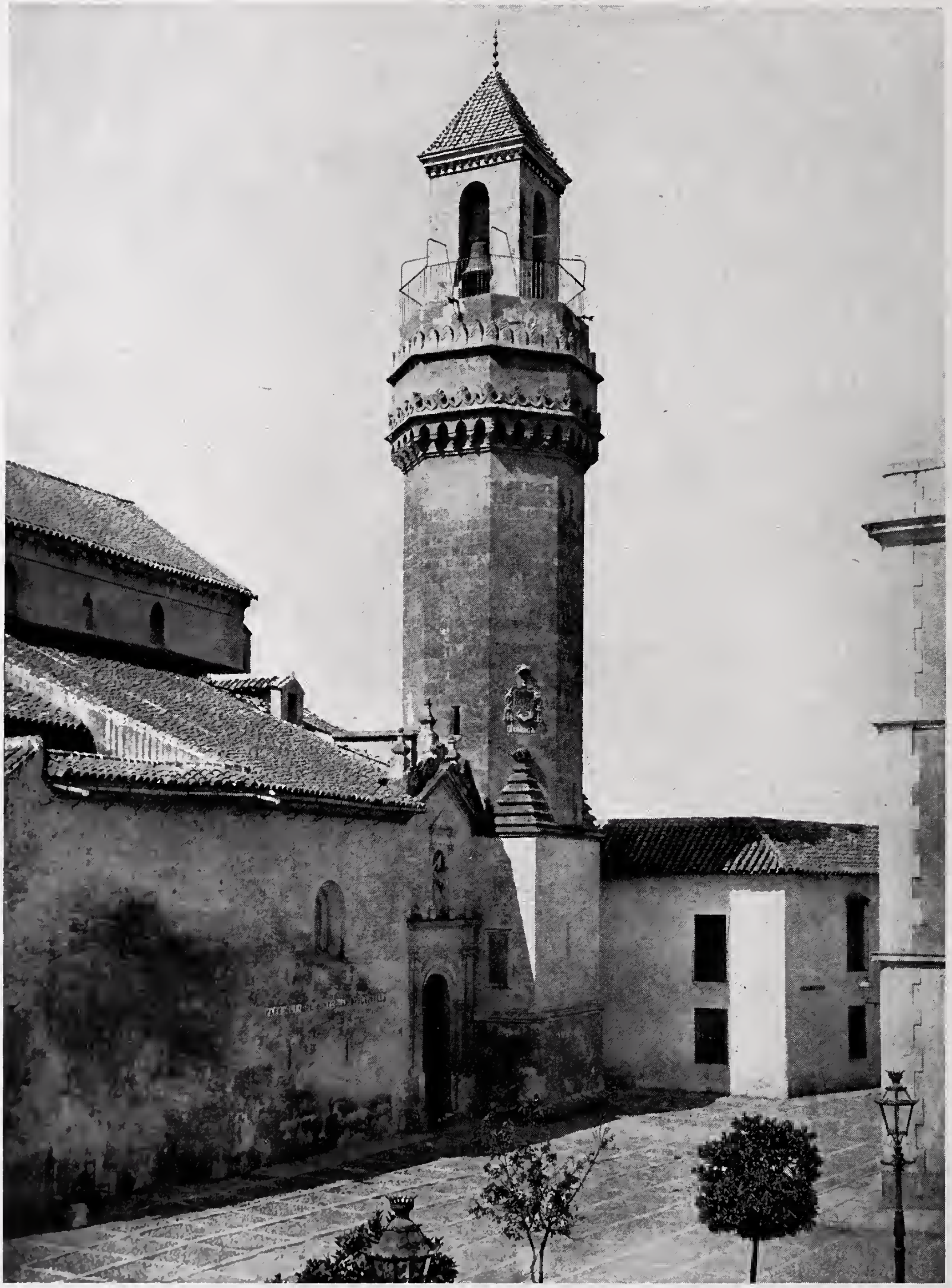
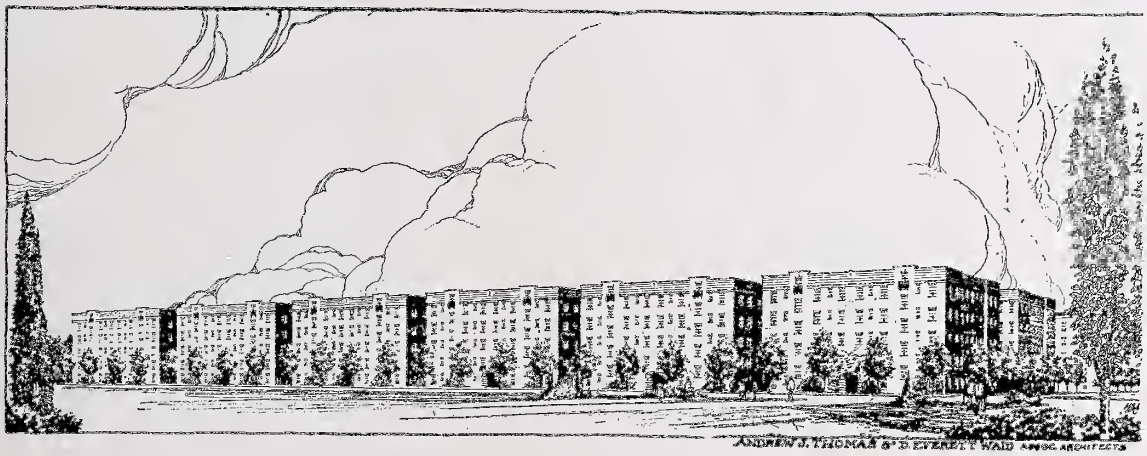


THE ST. NICHOLAS TOWER, CORDOVA

THE AMERICAN ARCHITECT
The ARCHITECTURAL REVIEW

VOL. CXXII WEDNESDAY, AUGUST 2, 1922 NUMBER 2399


ANDREW J. THOMAS & D. EVERETT WAID ASSOC. ARCHITECTS

# HOUSING PROJECT FOR METROPOLITAN LIFE INSURANCE COMPANY

ANDREW J. THOMAS AND D. EVERETT WAID, ASSOCIATE ARCHITECTS

THE housing project of the Metropolitan Life Insurance Company, will, it may with safety be predicted, mark the beginning of a new era in the architecture of American housing. It creates an entirely new standard in multi-family housing. What this means to the dwellers in crowded cities will be realized by comparison with standards which have been established in the housing problems of individual dwellings in small towns and suburbs of cities.

The last thirty years have developed remarkable progress in small town housing. The American who lives in the small house of the best type, of five or six rooms, located on a little plot of land, enjoys, in comfort and convenience, the highest standards of living in the world.

But his city brother has not been equally fortunate. Hasty and speculative methods of building, characterized by unenlightened copying of out-of-date models, have up to a few years ago, retarded real improvement. Since the World War, progress has been more rapid. The Metropolitan Life Insurance Company through its architects has taken advantage of recent improvements to produce a new type of model housing, believed to be better than anything of the kind ever before attempted.

There are necessarily many sides to a project so vast, and with countless technical ramifications, but the appeal to the public, as well as to professional housing experts, will be found in the practical aspect. The vastness of scale of this operation is shown in the fact that it comprises 50 buildings each housing 39 families, a total of 1950 families occupying 8250 rooms.

The economics which have been worked out in the design are in a sense extraordinary, extending as they do from the main essentials to the smallest details of architecture. More than anything else, the large scale of operation creates the greatest savings. The benefits of large scale operation and organization are just as great in housing as in any other form of production. They extend to design and construction, that is to say, the *use* of materials, and the buying of materials, the systematizing of erection, and — equally important — the maintenance and operation of the houses after they are completed. The design of these apartment houses has been worked out to establish the maximum economy in all these respects.

In these economics, the repetition of one unit fifty times permits the design of that unit to be perfected with great care, and in a manner which

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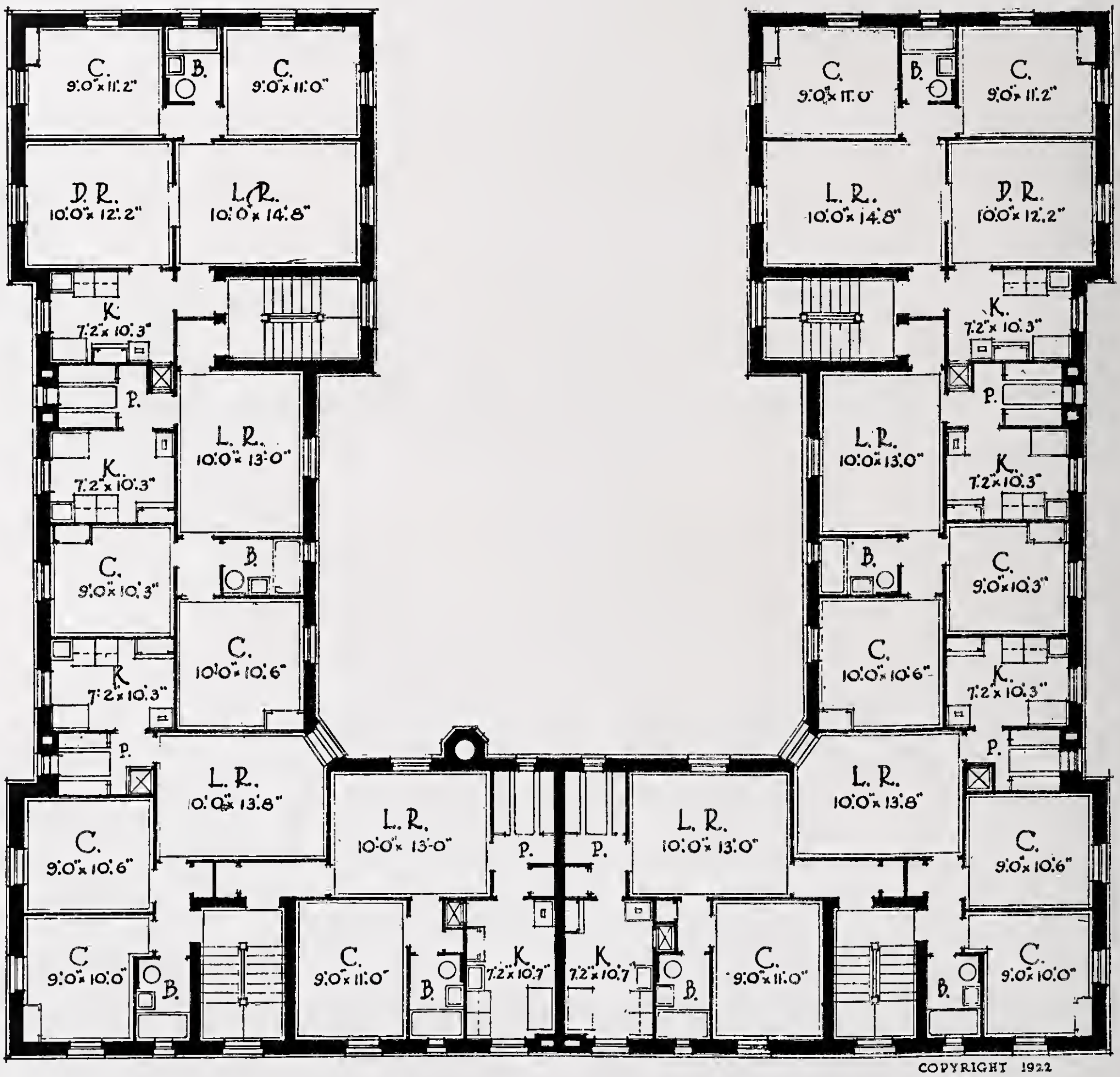
would not be possible, because too expensive, if a single unit only were to be built. Every possible saving, large or small, has been made through intensive study of the design on the part of the architect. Concentration of space, compactness of details, the fine openness of the plan, the careful consideration of every brick and every piece of timber and trim, the use of stock details, and the careful working out of the mechanical features of heating, plumbing and electricity, where every foot of piping and each valve has been calculated as to cost and efficiency—these are some of the problems solved and ends achieved. As examples, the excavation work has been almost eliminated by placing the heating plant along the fronts of the building, requiring only one long trench on each street. Windows are generally of one size.



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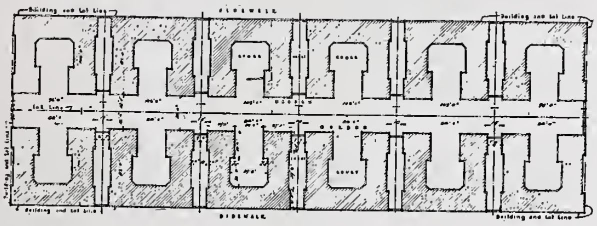
TYPICAL FLOOR PLAN

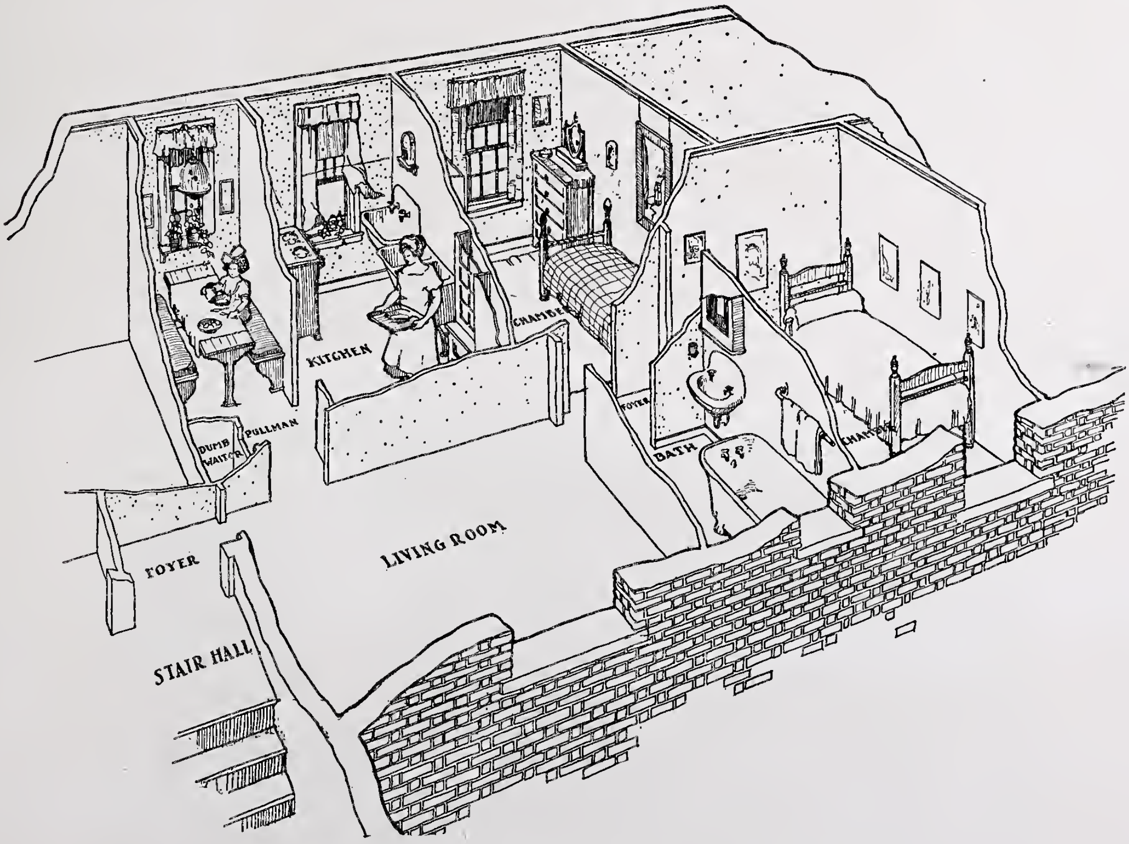
Great as these benefits are, however, they are not as important as the advantages gained by big scale planning of a city block as a whole—probably the highest point housing economics can reach.

Because of this concentration of space in the apartments themselves with elimination of non-rent paying space in the form of public corridors, the plan of the buildings has been opened up to give the maximum of sunshine, of circulation of air and of cheerful outlook. Each unit stands free, and as the picture shows, dividing the usual solid street wall into twelve buildings, housing 39 families each. Together they occupy approximately only fifty per cent. of the area of the block. This type of design, together with the U shaped plan of each unit, makes possible three prominent features.



Plot Plan

The first of these is the large interior garden, about 36 feet wide by 600 feet long, extending through the center block, affording a fine outlook over green lawns and good planting. This garden area is preferable to the hot, dirty and noisy street. Second, is the series of twelve U shaped courts, opening into this great garden and thereby creating cross gardens, so to speak, each about 154 feet long by 40 feet at the widest point. And thirdly, there are the passageways between buildings at intervals of 100 feet into the interior garden. These passageways have numerous advantages: together with the courts, they bring outside light into the buildings and they permit the planning of a large number of corner bedrooms and create splendid cross ventilation, in the individual apartments. They also permit the fire escapes—those disfiguring features which encroach on the sidewalks and ruin the appearance of New York City streets—to be placed so as to be almost out of sight. Furthermore, they are important from a fire risk standpoint, as they cut down the hazard by breaking up the solid building mass with open passages along the street.

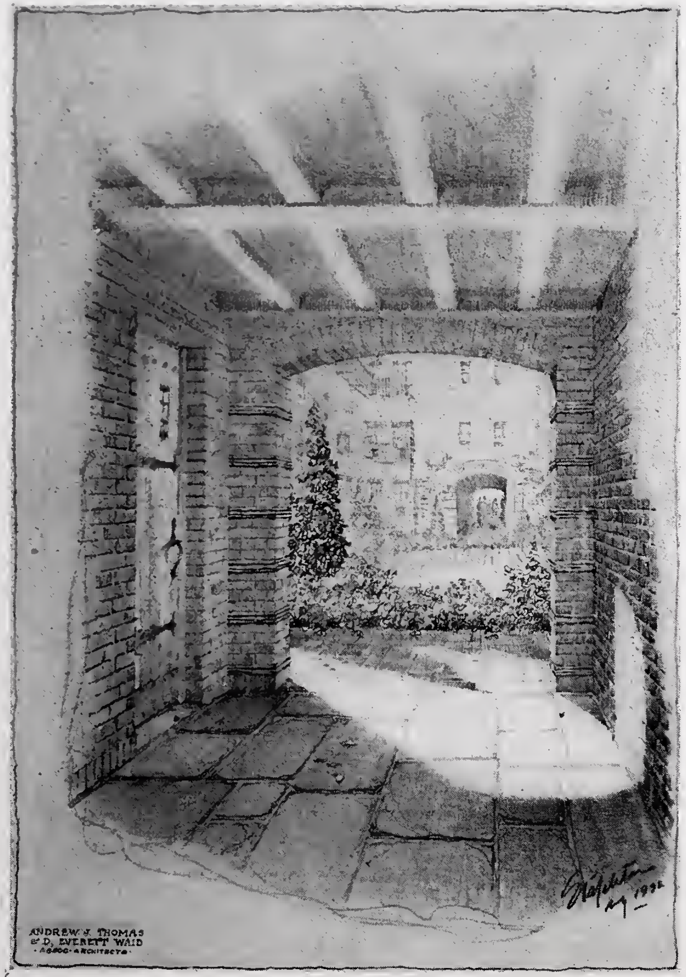


View of Interior, showing Middle Apartment on right hand side of plan

The value of this plan to the individual tenant is easily seen. To begin with, one apartment is almost as good as another. The rear apartments with their quiet outlook over the gardens are even more desirable, because of street noise and dust, than those situated along the front. What this means may be realized by making a comparison with the stereotyped discredited "rear" apartment, with its situation on narrow, pocketed, dark and badly-ventilated side courts; or on a dingy rear yard, with outlook over back fences and alleys.

### THE PLAN

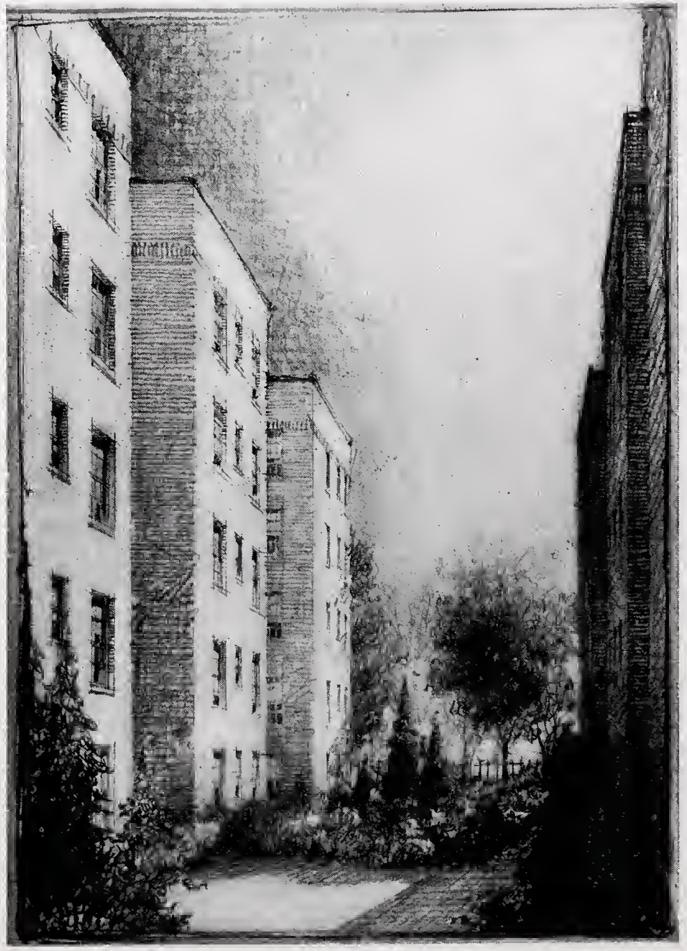
SUCH are the main features of the Metropolitan housing project in its economic and technical aspect. The real human interest, however, lies in the arrangement of apartments themselves. This fact the architects have always kept foremost in mind throughout the development of the design. They realized that, when all was said and done,



View in Court
(From the Architects' Drawing)

HOUSING SCHEME
for
METROPOLITAN
LIFE INSURANCE
COMPANY,
NEW YORK

ANDREW J. THOMAS
and
D. EVERETT WAID
Architects



Look into the Court

they were providing homes for living people, real homes which should be as humanly comfortable as possible. They thought of the tenants as possible owners and that therefore economy in repairs is an object to attain. They also thought of operation and maintenance and objected to those extreme "savings" in construction which would be many times lost in subsequent repairs or upkeep.

The cheerfulness and homelike character and the outlook, and outdoor air and sunshine, were, as explained above, paramount. Every apartment has cross ventilation and corner rooms are frequent on the plan. There are always two and sometimes three exposures to each apartment, as in a country house. When it came to domestic arrangements the architects realized that the one to consult was not alone the expert, but the housewife herself, who could count better than anyone else the steps saved in performing her housework and the time and labor she might economize. The plans were passed upon by women experts in this type of work, who had carefully investigated the actual working out of the arrangements of the model tenement and had discovered that, the women who lived in them were dissatisfied with many of present living arrangements. Particularly they found much complaint over the combination of living room and kitchen into one room, as adding largely to their work and interfering with their privacy.

In addition, the architects submitted their plans for criticism to an audience of mothers at several large meetings, held in one of the East Side Settlements, where every detail was discussed.

The typical arrangement is shown in the accompanying perspective of an apartment interior. It shows a triple division of each apartment into living room, kitchen and dining facilities and bedroom portions—an aid both to operation and to privacy. There are only two apartments to a stairhall, aiding further to the privacy, and each living room is separated from the hall by a small foyer. The kitchen part is separated from the living room, and contains the latest improvements in domestic equipment. A gas cooking range with hood, a sink and two wash tubs with white enamelled metal cover, hinged to swing up against the wall when the tubs are in use, and serving as a drainboard for the sink at other times; a dresser, a refrigerator and a dumbwaiter are the principal features. All is arranged to save the housewife steps, and a little space is provided, screened off from the rest of the kitchen, for eating.

The chambers, together with the bathroom, are screened off from the living room. All the interior details are simple but in good architectural taste. The rooms are of good size for this type of work, well above the minimum sizes allowed by law.

Thus is provided a remarkably efficient, ample and comfortable, human home. Although a few of the apartments are larger or smaller, the Metropolitan Life Insurance Company has adhered to the standard of the four-room apartment for the great majority. This is a most progressive decision, because it repudiates the two and three-room standard, which has been adopted for much housing since the war, as being definitely below the American standard of living.

Still another great advance in living standards is the mechanical features. Although steam heat, hot water and electricity, are not usually provided at these rentals, they could be included in the plan because of the savings made in other ways. What this means in the cost of living of the single family may be realized when it is considered that only a little more than two tons of coal will be required to heat one apartment, while six or more tons would be needed to heat the five-room individual dwelling.

This complex design has resulted in an architectural exterior of dignified effect. By reason of the separate buildings, the monotony of the long street wall is broken. The simple building masses, with their contrast of windows and wall spaces and the big center archways of the entrance passageways and the vistas into the courts—these features, the architects feel, will furnish a homelike appearance to the group. The more one studies this well considered architectural scheme, the more it is to realize its well considered economies and homelike character. It appears to be sound in every essential and all its details. It undoubtedly will have a revolutionary effect on city housing and also on certain phases of city life.

# THOMAS HASTINGS, R. I. B. A. GOLD MEDALLIST, 1922

THE following editorial, commenting on the presentation of the Gold Medal of the Royal Institute of British Architects to Mr. Thomas Hastings, appearing in *The Architect*, of London, in its issue of June 30, will, we are sure, be read with interest by architects in this country. It states, in part:

"We are in cordial agreement with all that Mr. Waterhouse said in presenting the Royal Gold Medal to Mr. Thomas Hastings on Monday evening last, and divided though we frequently are in questions of professional politics, Mr. Hastings may feel sure that the great honor awarded him is in the opinion of his colleagues in this country a well-merited and unavoidable one. Since the deaths of Stanford White and Charles McKim there has been no American architect who so fully sums up in his achievements the expression of what may be described as the architectural Renaissance of the modern world. We are convinced that in centuries yet unborn men will recall the great works which have been produced by the best designers in America during the last four decades as we recall the achievements of the masters of the Italian Renaissance. More than this, it is probable that to America is chiefly due the growing conviction that architecture is among the greatest expressions of civilization, and one in the growth and permanence of which all should feel pride and interest. And it may be further added that the fact that this Renaissance has occurred in a land the people of which have justly earned for themselves the reputation of being the most hard-headed business community in the world, has a special significance.

"That American architects should be firmly convinced that out of tradition alone real architectural development is possible may seem surprising to those who look at the question superficially. In reality it is inevitable. Architecture is little more than the expression, more or less direct, of construction; and construction is governed by scientific laws. As Macvicar Anderson said years ago in a presidential address, people were always asking for some new expression of architectural form, but the habits and wants of men of which it is the outcome have remained much the same for untold generations. He might have added that the physical laws to which it had to conform were even more unchangeable, and that the early builders had conformed to these through instinct while we conform to them through fuller knowledge and understanding. It is difficult, if not impossible, to separate the so-called decorative adjuncts of architecture from the constructional, but if we imagine we can succeed in doing so—and it may be pointed out that this alone is what the exponents of *l'art nouveau* and similar manifestations have tried to do—it has been merely to substitute a number of weird and unmeaning forms for others which have the sanction of generations of architects and which appeal to us like the words of a language with which we are familiar. Roger Fry, Clive Bell and other writers on art produce a maze of words about 'essential beauty in structure,' but they fail to point out any illustrations of their definite meaning or to give any reasons for their condemnation of conventions of the past.

"It was necessary that in laying the foundations of the great structure of modern American architecture its exponents should build on some precedent and on some definite system, and it was equally clear that the choice of that foundation should be the Ecole des Beaux-Arts, for in France alone has architecture been recognized as an important national interest from the days of Colbert. American architecture, however, shows in its development that it is no transplanted growth but the outcome of systematic and scientific thought. In Florida and California the indigenous architecture of old Spanish colonies has been absorbed and developed; while in New England the original Colonial and Old Dutch types have enriched the American vernacular. Another controlling element has been the necessity for devising buildings of a scale and height not attempted in Europe, comprising within their construction the last improvements of invention and science.

"All these factors have ended in the production of a school of architecture which is as distinctive as that of France, and which, to use a simile, has only borrowed when it could repay with interest. To the pioneers of the great movement, of whom Mr. Hastings and his late partner, Carrère, were great protagonists, we as architects owe a debt of gratitude. What seems natural and passes unchallenged and admired today was not achieved without hard work and much controversy in the darker days of the last century, when the 'brown stone' fronts of Boston and New York were as tasteless as the majority of our Victorian buildings and when the average American millionaire was no more cultured than his British colleague. The enlightenment of America to the merits of architecture and of design is not due to the inherent taste of the American people, but to the fact that its architects have proved their ability to lead and to direct a great movement. The building instinct is not entirely the outcome of the possession of great wealth but in no small measure due to the fact that American architects have given full value for funds they have expended in their clients' interests."

# ADDRESS OF PAUL WATERHOUSE, PRESIDENT, R. I. B. A., ON PRESENTATION OF ROYAL GOLD MEDAL TO THOMAS HASTINGS

"IT will be of very little interest to Mr. Hastings to be told that he has been the author of 50 works of really first-class importance, that six or more of these were of parliamentary or municipal consequence, that the remainder are libraries, university halls, banks, railway stations, hotels, bridges, monuments, as well as vast town-planning schemes; or to be reminded that the buildings so enumerated comprise only those which have been thought conspicuous enough to put into a list. I have little doubt but that the unrecorded remainder would be sufficient to make two or three European architects contentedly rich and reasonably famous.

"What may affect Mr. Hastings, and what does affect us, is the supreme significance in modern history of forty years' work such as his.

"I am perfectly sure that the opening words of any reply which Mr. Hastings is good enough to give us tonight will be a modest disclaimer. He will say that we are asking our King to honor his epoch and his country, and that the allocation of this honor to his individual personality is a mere accident. Let him say so. He will not thereby shield himself from the direct attacks of our respectful homage, nor will he dilute or divert in any degree the enthusiasm with which we acclaim him as the man of the hour.

"It is perfectly true that we are consciously applauding America of the twentieth century. But what of that? It is the architects of America who make American architecture, and in searching for a true and significant example of that group of creators we have—with very great, very careful deliberation—thrown our choice on Mr. Hastings. I am sure we will stand firm in support of our own judgment. Mr. Hastings can diffuse, as much as he pleases, our compliments among his able countrymen, so long as it is on his neck that the King's Gold Medal crosses the Atlantic, and so long as he is our most respectfully chosen ambassador.

"The very fact that Mr. Hastings is surrounded in the States by confrères whose aims are his own, the very fact that there are others in his favored country who may rightly be classed as of Gold Medal rank, only enhances, I hope, the honor which we try to pay to him and through him to his colleagues, many of whom are men to whom his example, his rivalry, and his instruction have meant much.

"I make no apology for being, by the accident of the Presidency, the man through whose hands the medal passes from its gracious giver to its worthy receiver. Rather do I with complete immodesty rejoice that so great a piece of good luck falls in my way, for I have wanted, above many other wants, to stand face to face with a great American architect and tell him exactly what I think of the present-day school of American design in architecture.

"I believe, with a very profound belief, that it represents a most significant fact in the history of our art. I do not say 'of our age,' but of that ageless company of centuries which, viewed from Art's point of view, stand not behind one another in series, but abreast. There is a reality called Eternity. Some define it as time with the beginning and the end removed. They define it falsely. It is the great Now. It lies with architects more than with other artists, it lies with artists more than with other men, to realize (and this is a realization shared with religion) that the brotherhood of man has its extension forth and back in time no less than East and West in space.

"This is not wandering on my part. I could make it plainer by detaining you with a history of civilization (if I were capable of it). I would sooner try to make it plain by talking about the United States.

"There is much heretic talk of progress in architectural design. There *is* progress, of course; but there is much more evidence of the sham progress which is no friend of art at all. The horrible experiment to which a certain old-world country is submitting herself, the experiment of attempting an architecture 'free from historic style,' would be a nightmare to Europe and a grim menace to all lovers of the beautiful were there not a bright hope that so foul a conflagration will soon burn itself out.

"Let us turn happy eyes to America and take to our hearts the remarkable testimony she gives to the divine sovereignty of tradition.

"America is of all countries the land whose civilization was unprejudiced—a vigorous population on virgin soil found itself free to look forward without any obligation to look back. There was the country of all countries in which could flourish unhindered and undismayed that traditionless architecture which is the dream of some of our art philosophers.

"But what has come to America in her freedom? What, after the early flutterings of untried wings, has been the direction of her flight? What star guided her? What voice prompted her? None other than the star of that civilization which leads and has led old Europe, no voice but the voice of the ancients.

"Ladies and gentlemen, were there ever wanting some proof that our happy bondage to the ways of our forefathers is not a bigot's delusion, but a free man's song of liberty, that proof is given to us by the choice of America—or shall I say rather by America's joyous submission to the golden chains in which we also labor?

"In the name, Mr. Hastings, of our gracious King, and as the spokesman of my brother architects of England, I transfer to you the greatest testimony we have to offer; and, in doing so, I thank you and your colleagues in America for the encouragement you give to our ancient art, and I congratulate you with the warmest cordiality on the fact that your line of thought, your line of work, and your spirit of achievement are the very spirit, work, and thought that have for centuries bound into a timeless brotherhood the architects of Europe."

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# ADDRESS BY THOMAS HASTINGS, F. A. I. A., ON ACCEPTANCE OF THE ROYAL GOLD MEDAL OF THE R. I. B. A.

"WHILE we Americans have inherited your language and consequently have no right to complain, I must admit on this occasion I find the English vocabulary quite inadequate—there are no words to express my grateful appreciation of the honor which His Gracious Majesty the King has conferred upon me. Realizing that it was prompted by the action of this time honored Institution, I would like to feel that it is in recognition of such service as the profession in our country has rendered in the interest of contemporaneous architectural education. In all sincerity, I would rather believe that by example I had in some way influenced others in the right direction than to be conscious of individual success or feel that what little I have done were worthy of your commendation.

"I believe we should return to follow and respect the traditions which obtained before the present modern confusion, that we should be careful of the direction in which we work and thoughtful of our influence upon future generations. It would truly seem that nowhere has such remarkable progress been made, as obtains in America in the methods of teaching architecture. Great changes have been brought about largely because of the indirect influence of the many graduates of the Paris Ecole des Beaux-Arts. For several years I have had the honor of being President of The Beaux-Arts Institute of Design in America, which is composed of graduates of the Paris School. In this capacity I have had perhaps an exceptional opportunity to observe their untiring efforts in behalf of education. They have practically brought about a centralized and co-ordinated system of competition or comparison between our schools and colleges, similar to what obtains physically in the intercollegiate games.

"Practically all the colleges from the Atlantic to the Pacific receive simultaneously our programs and send the work of their students all solving the same problem to be judged by our society in New York. This healthful situation might perhaps have been brought about by any other well organized institution, not necessarily of Beaux-Arts affiliations, in which case it might equally as well have resulted in awakening this unusual interest and improvement in the quality of the students' work, as well as in the curriculum of our many colleges scattered throughout the country.

"This architectural interscholastic work in America has in a measure brought into effect what is always greatly to be desired, a recognized art center in the metropolis of a country. I am heartily in sympathy with this, for I feel that a school should communicate something of the spirit of the sportsman to the life of the student, in the development of the mental as well as the physical side of his character, stimulating a form of intellectual curiosity which will make him rise above mere unimaginative and pedantic proficiency. While a thorough education is of paramount value to an architect, it is, after all, the true inborn sense of beauty which assures his success. Goethe said: 'The Beautiful is a manifestation of secret laws of nature, which but for this appearance, had been forever concealed from us.'

"The layman too frequently, only superficially understands Beauty in defining its attributes, as though it were a mere appeal to the emotions, a pleasure-giving luxury, or a refining influence. It is rather an organic vital provision of nature, manifestly a part of the order of the universe—divinely ordained for the specific purpose of promoting and insuring economy and permanency in all things and giving life and enthusiasm wherever it may find its resting place. It is indeed a force in life capable of stimulating the noblest endeavor and capable of making virtue appeal to the senses, and making truth endure.

"Nowhere is this truth so vividly illustrated as when we consider architectural design. The practicing architect if he continues, as he should, to be a draftsman all his life, must realize that beauty of design and line build well in construction, and with greater economy and endurance than construction which is mere engineering. So the qualitative side should first be considered, then the quantitative side. All form and all design are the natural and legitimate outcome of the nature or purpose of the object to be made. The practical and the artistic are inseparable. There is beauty in nature because all nature is a practical problem well solved. The truly educated architect will never sacrifice the practical side of his problem. Some of the greatest economic as well as architectural calamities have been executed by so-called practical men with an experience mostly bad and with no education.

"The science of modern engineering has too frequently divorced the architect from many of the larger and more interesting so-called utilitarian problems of construction. Some of them are legitimately architectural problems while in other cases the architect should collaborate with the engineer. There may be no question of decoration or ornament involved, but architecture and practically all construction are inseparable.

"An earnest appeal should be made for this collaboration not merely in the interest of beauty but rather more in the interest of economy; beauty will follow in its natural sequence. In the larger municipal and suburban problems requiring economy in cost, and saving of energy, even when commercial and investment interests are involved, in problems of traffic, rapid transit, and public comfort, under all conditions in the solution of these greater problems the qualitative and quantitative viewpoints should be inseparable. Following the natural laws of the survival of the most economical, as well as the fittest if undertaken with art, beauty will predominate in the end, and so deliver us from the defacement of nature and make the city and suburbs fit to live in, especially where the working and poorer classes are concerned. Only in this way can we hope to obliterate even more successfully than with charity the sordid habits of life and the depravity of poverty.

"Such problems may only involve a thorough knowledge of good planning.

"In the first years of my architectural career I was accused by my fellow countrymen of attaching too much importance to the artistic study of the floor plan; it was constantly asserted that I was trying to inculcate the Paris Beaux-Arts methods of education into our American architectural practice, my critics not realizing that these methods of study in plan have been adhered to at all times since the beginning of architecture.

"They little realize that if the floor plan, determining two of the three dimensions in space, is well studied, beautiful in proportions, with a proper distribution of piers, thickness of walls, logically disposed and with good circulation, there will be no structural difficulties, and that this principle has obtained ever since the dawn of architectural history. The plan lends itself to thinking in three dimensions. When the plan looks well, it builds well, constructs well, so that we find we need very little of the analytical mathematics to assist us excepting as a mere matter of verification. Until modern times, architects knew but little about analytical mathematics as compared with what we are now given to learn, but they knew their stereotomy better than most of us do today. They knew but little about the strength of materials, but they understood constructive principles, for after all analytical mathematics is a comparatively modern science. They knew their descriptive mathematics based upon geometry. While there existed graphical rules for the approximate determination of the thrusts from arches as early as the thirteenth century, yet it is practically only within the last century that the correct principles of constructive analysis have been fully developed. Until recently architects probably never calculated the strength of their materials or the thrust of arches and vaults. The drawings that were necessary to execute the fan vaulted ceiling of stone 85 ft. span in Kings College Chapel at Cambridge, or the ceiling in your beautiful Henry VII Chapel at Westminster Abbey, must have required a knowledge of stereotomy far more thorough than most of us possess today. We so seldom have an opportunity to build stone vaults so intricate in design.

"If an arch or a bridge looks well, it will build well, when it is the outcome of a well studied plan. There must have occurred many serious calamities in the past because of bad art and no analytical means of verification, but just as nature is beautiful when fit to survive, so the great buildings and monuments of the past that have survived are beautiful in plan, form, and proportion. It is really architecture and well proportioned masonry versus engineering and iron, a comparatively new profession and a new material; each has its use but they are not interchangeable. Good construction is intelligence rather than ingenuity. I believe that buildings have stood for centuries solely because their plans as seen on paper were so thoroughly artistic and beautiful. Rheims Cathedral has stood for more than 700 years through all the wars that raged about it. As a matter of fact, it had been respected and spared by the soldiers of the middle ages, Barbarians, so-called, and it remained for the army officers of our time, men supposed to be cultured, to commit the present-day ruthless deed of destruction. It stood in the after glow of its hundreds of years, seeing generations pass away, bidding welcome to new ones, it stood a source of inspiration to the world, it breathed a spirit something hardly seen, something felt. And today it is to lovers of the beautiful as though some one had forever eliminated the colors of the setting sun. We pride ourselves upon our enlightenment and advancement—we have pointed with derision to the unenlightened dark ages, yet this destruction has been encompassed by a period that vaunts its culture. So that what remains of the Cathedral stands not only a monument to modern civilization; but having withstood like a fortress in its structural lines the onslaught of modern bombardment, it beautifully illustrates the splendid strength of construction well planned with beauty and economy. We are told that the cell of the bee is built at that angle which gives the most strength with the least wax so that the line of beauty is the result of perfect economy. Emerson realized the truth when he said it is a rule of largest application, true in a plant, true in a loaf of bread, that in the construction of any fabric or organism, any real increase of fitness to its end is an increase of beauty.

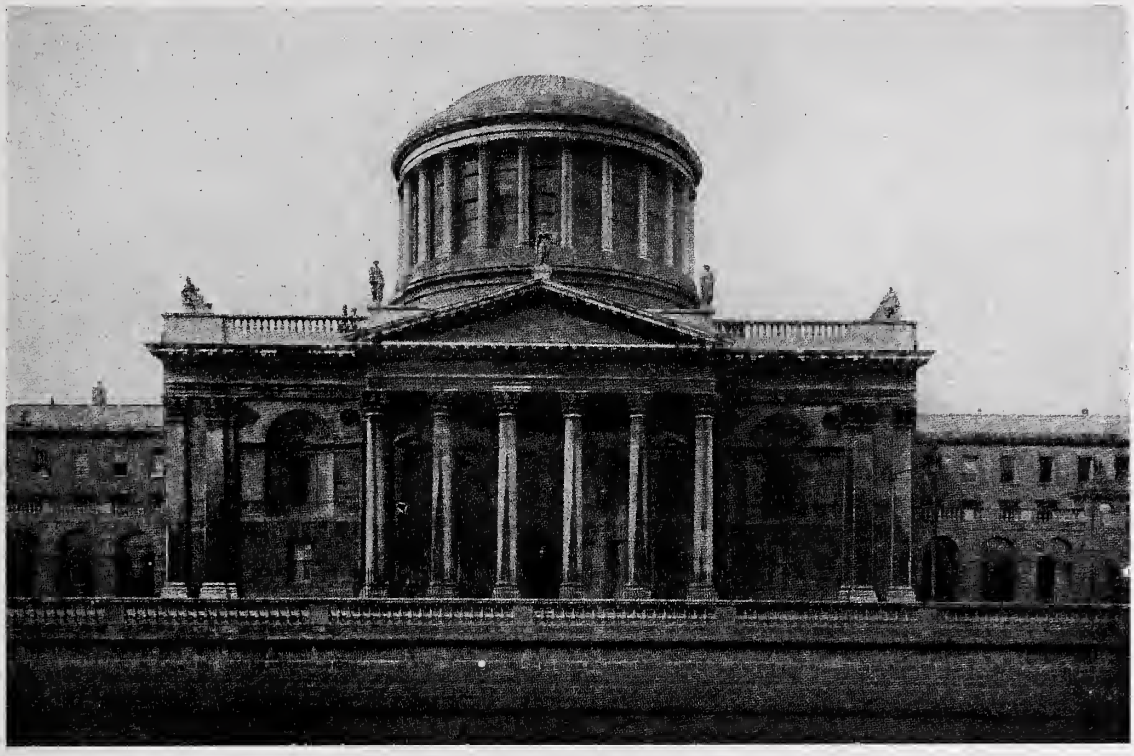
"These same principles of planning a building apply in the planning of a park or in the guiding of the evolution and growth of a great city. If there be beauty in the plans of our cities and in the buildings which adorn our public squares and highways, its influence will make itself felt upon every passerby. Beauty in our buildings is an open book of involuntary education and refinement, and it uplifts and ennobles human character. It is a song and a sermon without words. It inculcates in a people a true sense of dignity, a sense of reverence and respect for tradition, and it makes an atmosphere in its environment which breeds the proper kind of contentment, that kind of contentment which stimulates true ambition. We Americans too little realize that we really come to Europe in a large measure because of what man has done with art to beautify Nature. As music is more beautiful than any merely natural sound, so Nature is generally either greatly enhanced by the human interest when man has made his impress upon it, or it is cruelly and unnecessarily sacrificed.

"Art and a proper artistic sense of the fitness of things complete the picture. When far away from civilization surrounded by primeval nature, a man, if in his normal state of mind, soon longs for the warmth and color of fertile fields, the thrift of farms; he thinks of forests interwoven by winding roads or vistas intelligently conceived. The pageantry of sea and sky, the starlit night, the rising or setting sun, the rugged mountains or deep crevices, the bewildering beauty of the flowers, can never awaken the same human emotions and sympathy as when with Art they are made more beautiful, wedded to weather-beaten walls, the castle or the shrine, or the distant romantic village nestled in the crevice or perched on the mountainside. There is of course much beauty in nature unadorned, for beauty is as boundless as space is infinite in its variety. I have said that I believe it to be a law of the universe that the forms of life that are fittest to survive—indeed the very universe itself—are beautiful in form and color, and that nature's selections are beautifully expressed. Ugliness, deformity and self-indulgence are synonymous. And so it is in every economy of life—what would survive must be beautifully expressed. It is equally true that one trained in the understanding of beauty can more profoundly fathom the laws of Nature than one who has neglected to develop this side of his education. Indeed if the way of the artist is undertaken with philosophy and humility, the things that are divine, God in the universe, will, I believe, be more clearly revealed to him, more impressively, more convincingly, than when approached by way of theological discussion or scientific research. The horizon of his vision contains more, within a larger circle, with visions of things more ennobling, more uplifting.

"And so in Literature as in Art, the subject matter must be expressed or presented with beauty in order to survive and firmly impress itself upon successive generations. It is the art in story telling which gives real life and human interest to the characters and which makes the fancy and imagination of the author outlive his own generation. Words may have color as full and luminous as may be found in any school of painting, and form as subtle and radiant as may be revealed in the art of the sculptor or the architect, and music as beautiful and melodious as a song. Truth or precept, as well as fiction, will only penetrate the human heart and demand respect and obedience when clothed in beauty. The proverbs, the bywords of the ages, are only familiar truths beautifully expressed with forceful simplicity and precise epigram; even mathematics have a beauty of their own, and while in some ways allied with beauty in art, both are different phases of what we might call generalized beauty. Every mathematical equation has a certain quality of beauty because it is orderly and complete in its visible expression of a truth. All the natural lines of stresses and strains in a solid are things of beauty, and every structure built to these true lines, *ipso facto,* is beautiful. Newton's laws of motion, so simple, so fundamental, so inclusive in their scope could only be enunciated with such elegance of expression to make them endure forever! The divine word of God as it has been revealed in any enduring philosophy or religion has always been enshrined in language immortal. There is beauty everywhere and there is no such thing as poverty if only we realize the universal ownership of beauty in Nature and Art.

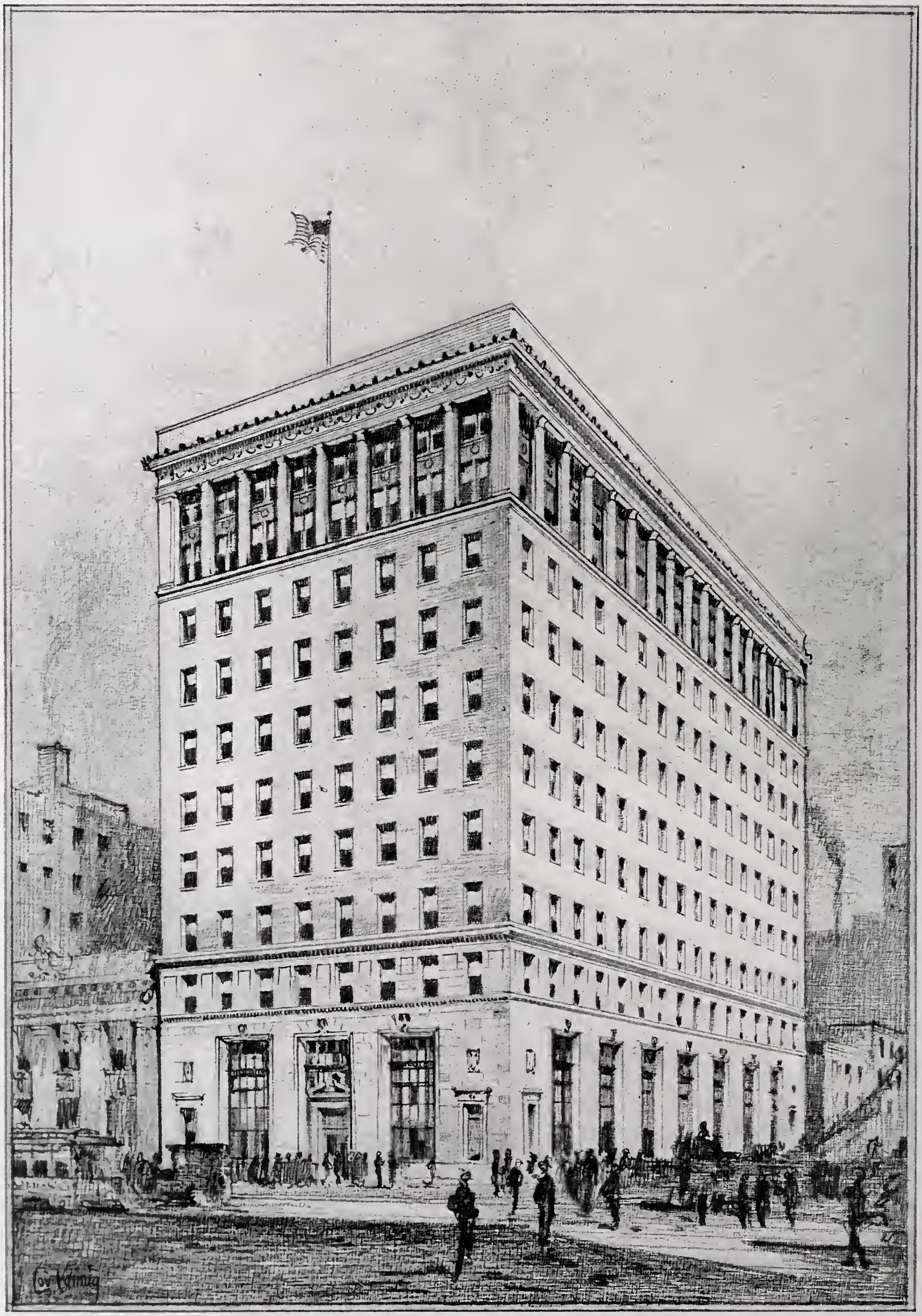
"You may own the land but not the landscape! You may have physical possession of a great picture or a building but if they are really great the man who truly owns them is the man who most appreciates its beauty. In the light of this truth in written word, in painted canvas, or chiseled stone, or in the harmonies and melodies of sound and in the beauty of nature all around, the richest man in the world is he who thinks right and best understands.

"May we more and more realize that the true way to educate the public to appreciate beauty is to teach it how to think and discriminate for itself. While I realize that the true and legitimate instruments of the artist are the brush and the palette, and the T-square, triangle and compass, in view of the present-day influence of literature upon art and the apparent authority which accompanies ignorant assertions when seen in print, I do not feel myself justified in coming to you tonight and asking you to look forward to the day when more artists, with more literary ability and greater authority, will respond to such opportunities as are offered to speak for themselves, for their fellow artists, and for the love of art and the beautiful, to add something of what they have learned from their working experience toward diagnosing the situation and toward counteracting the ill effects of illegitimate fault finding, and thus to supplement much of the refining and uplifting influence of true and serious literary criticism."



The Four Courts building, Dublin, Ireland, burnt during recent civil warfare. Designed in 1776 by Thomas Cooley and completed by James Gandon

*(From The Architects' Journal, London)*



STUDY FOR FIRST NATIONAL BANK, JERSEY CITY, N. J.

ALFRED C. BOSSOM, ARCHITECT

*(From the original pencil sketch by L. J. Keimig)*

# ·EDITORIAL·COMMENT·

**IT WOULD FILL ALL THE PAGES** of one issue of The American Architect to reprint the editorial allusion in London architectural papers to the presentation to Mr. Thomas Hastings of the Royal Gold Medal of the Royal Institute of British Architects. Mr. Hastings has received the very finest courtesies from the architectural press; his work and that of the firm of Carrere & Hastings have been splendidly illustrated, and throughout there have been the finest expressions of professional appreciation of the development of architecture in this country and the men who have so largely contributed to the success of that development. We may not forget these things. They are the ties that bind. They show so fine a professional attitude from men whose good opinion it is worth while having, that we are filled with sentiments which reciprocate these kindnesses.

Three Americans have thus far received the Royal Gold Medal of the Institute,—Richard Morris Hunt in 1893, Charles Follen McKim in 1903, and now, Thomas Hastings.

In the period of almost 30 years since Richard Morris Hunt received this distinction, the profession of architecture in the United States has achieved results that only those who have closely followed development can appreciate. Men of broad vision and scholarly and artistic abilities, have studiously blazed the way that culminates today in the fine appreciation by the president of the R. I. B. A. in his splendid address of presentation of the medal to Mr. Hastings.

And in his reply, Mr. Hastings has with much clarity and a proper use of words, indicated just what in his judgment has most influenced the progress of American architectural development.

* * *

**COMMENT HAS BEEN** previously made in these columns of a discussion on ethics in business relations as set forth in the May volume of the Annals of the American Academy of Political and Social Science. Included in this volume is an article by Professor Emil Lorch of the University of Michigan, on The Architectural Student and His Relation to Professional Practice. Professor Lorch very ably traces methods of architectural education from the apprenticeship system, or "articled" student, as in force in England and also the system early in force in this country, and points out that the beginning of architectural schools was coincident with the beginning of the American Institute of Architects.

We are not inclined to concur in the statement that in large offices the old bond between master and pupil is uncommon. If by "bond" is meant that early social relation when the "articled" student became a member of the "master's" family, the contention may be true, but if it is meant that the heads of well conducted offices have ceased to watch over and guide the progress of the young men who come to them from architectural schools, we believe we can prove that this fine attitude of paternalism still exists.

No one may question the value of the "documents" issued by the Institute, so warmly commended by Professor Lorch, but it may be possible to debate his contention as to their strong value to architectural students. A university education in architecture, if correctly carried forward, teaches the student to *think* in terms of architecture. What he needs in addition to that properly developed faculty, is how to *act* in terms of architecture.

Much of the criticism of architectural education is based on a contention that it does not teach both. And, until it can, a post graduate experience in a well organized office will be essential to the thoroughly practical mental equipment of every student.

If the architectural schools are compelled to receive students whose previous education has been only through common or high school courses, too great a part of the four years must be spent in preparing the student for the elements of his architectural education. Large numbers of enrollment are sought and the standards of admittance are now too low. If these standards are raised, and maintained by all architectural schools, the misfit will be eliminated, and the student's four years be one of strictly architectural education and not so largely given over to a preparation for it.

If any element of weakness exists in the arguments of those who head our architectural schools, it lies more largely in the magnification of ethical relations, ultra artistic attitudes and theoretical aspects of practice.

It may be conceded that the Institute through its Committee on Education, is accomplishing the things Professor Lorch claims for it. But, while its reports do accent some of the æsthetic features of architectural education, they also urge, and very properly, the introduction of wider opportunities on the part of the student for practical observation, and do not favor that he shall first come in contact with these practical elements when he takes up work in an office after graduation. It may not be unreasonable to assume that daily association with men, who, like himself, are engaged in a study of all the arts, will teach the student the ethics, not only of his profession, but of his relations to the world at large.

Time spent on too prolonged a discussion of topics that are part of all professions and the daily habit of honest men, might be applied to a more practical association with the actualities of building, on the part of a man whose purpose is to become a master builder as well as an artist.

* * *

UNDOUBTEDLY WE WOULD more intelligently and more quickly realize our artistic ideals in this country if matters pertaining to art could be decided by competent persons. But, when projects are contemplated involving a large expenditure, there at once appear the politician and all the uncertain elements that contribute to incompetency.

Just now in New York there is a project afoot to construct a memorial arch and swimming pool in Central Park. This "inland Coney Island," as it has been correctly called, with the possibilities of large expenditures of money and later trading in concessions, has received the approval of Tammany Hall, as represented in the person of Mayor Hylan. It means nothing to "his Honor" that all of the important art societies in New York strongly oppose the scheme. What is more important is the opportunity to pose as the friend of the poor people with the added possibility of good campaign material at coming elections.

Central Park, at one time and another, has for years been threatened by political interests who saw fine opportunities for personal gain. These proposed encroachments have been successfully opposed, but now a proposition is presented so insiduously proclaimed as for the benefit of the classes for which the park is supposed to be maintained, as to secure among unthinking people a clamorous approval.

Central Park, as pointed out in these pages some time ago, while located in the very center of the best resident section of Manhattan Island, has become the playground of the people of the congested areas on the East Side. Fifth Avenue from 59th Street North has more large and pretentious houses than any other section. Central Park South,—59th Street between Fifth and Eighth Avenues,—is lined with hotels and apartment houses of the best types. And on this part of the border of Central Park there will probably be located the proposed new Art Center. Central Park West, from 59th to 110th Streets, is also the location of many important churches, theatres and apartment houses.

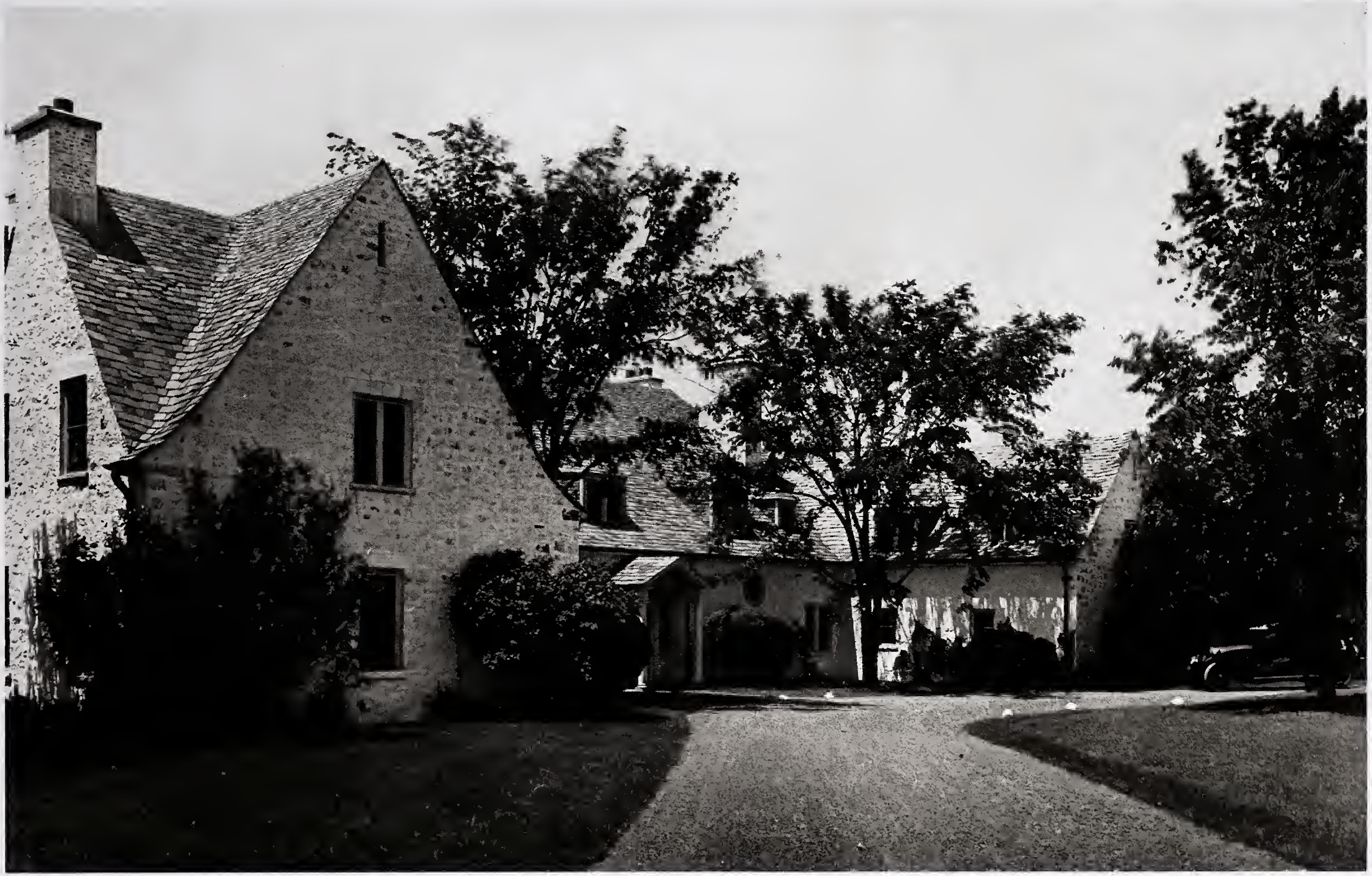
Mayor Hylan proposes to erect exactly in the center of this fine district, a memorial arch and a swimming pool, that will be more largely patronized by a class whose daily domestic lives have no part with those of the large body of people whose homes border on the park.

We are strongly in favor of any scheme that will afford the largest opportunities for recreation for all the people. But even the casual observer knows the reckless disregard for civic decency that characterizes the present use of the park by people who come long distances from congested sections, thus to a large extent, causing those who live nearby to abandon it as a recreative spot.

To popularize the park to this class by the proposed plan, is to create in Central Park identically the same conditions that led to zoning regulations in New York to prevent the invasion of certain well maintained districts by types of buildings that ruin complete neighborhoods.

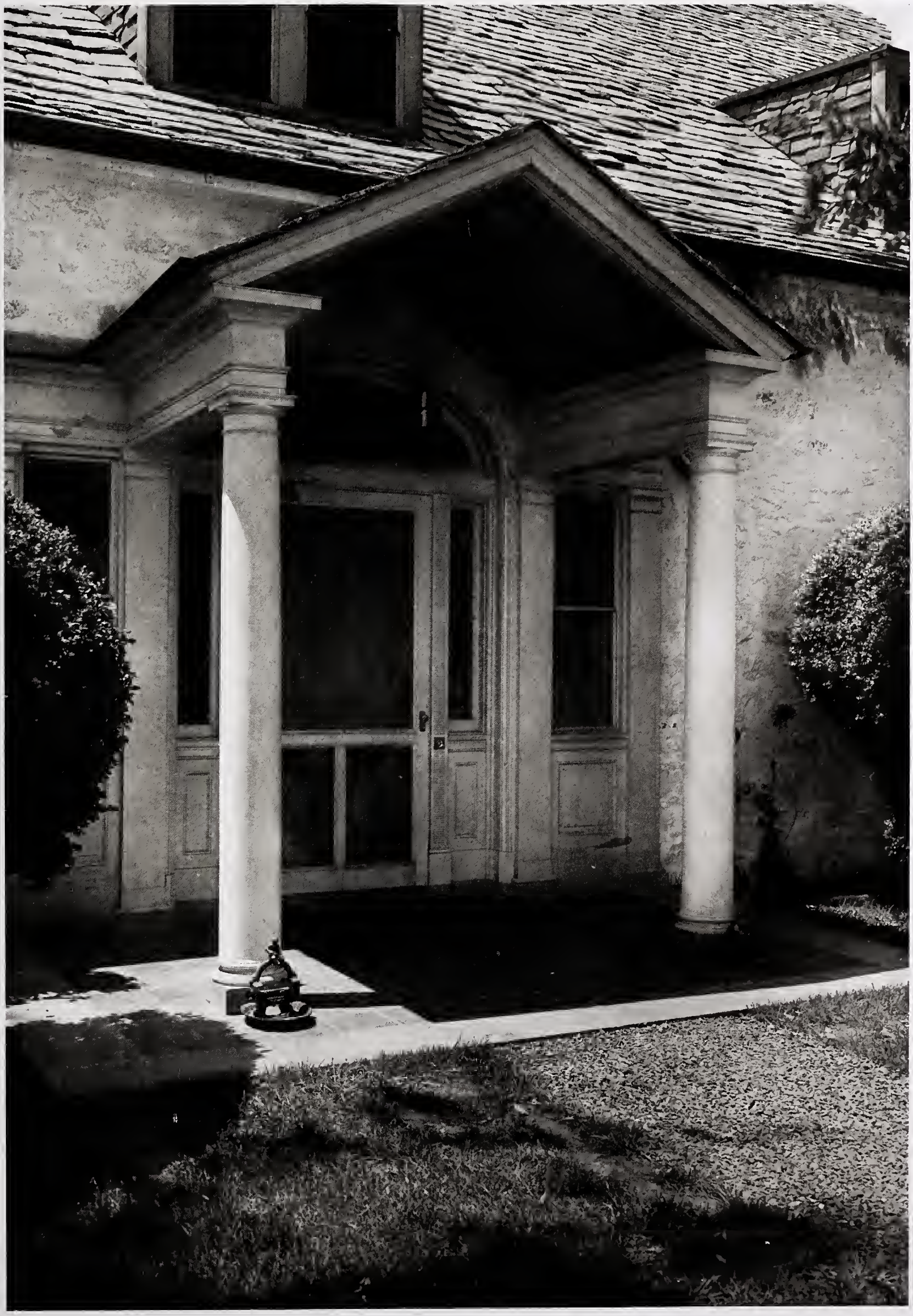
Why not extend the zoning regulation to Central Park, and thus for all time prevent the attacks of political interests that, masquerading under a profession to serve the people, more largely serve their own selfish schemes?

Model of British Pavilion, Rio de Janeiro, Brazil Centenary Exposition
Jno. W. Simpson and Maxwell Ayrton, Architects
*(From The Architects' Journal, London)*



HOUSE AT FAR HILLS, NEW JERSEY

CROSS & CROSS, ARCHITECTS



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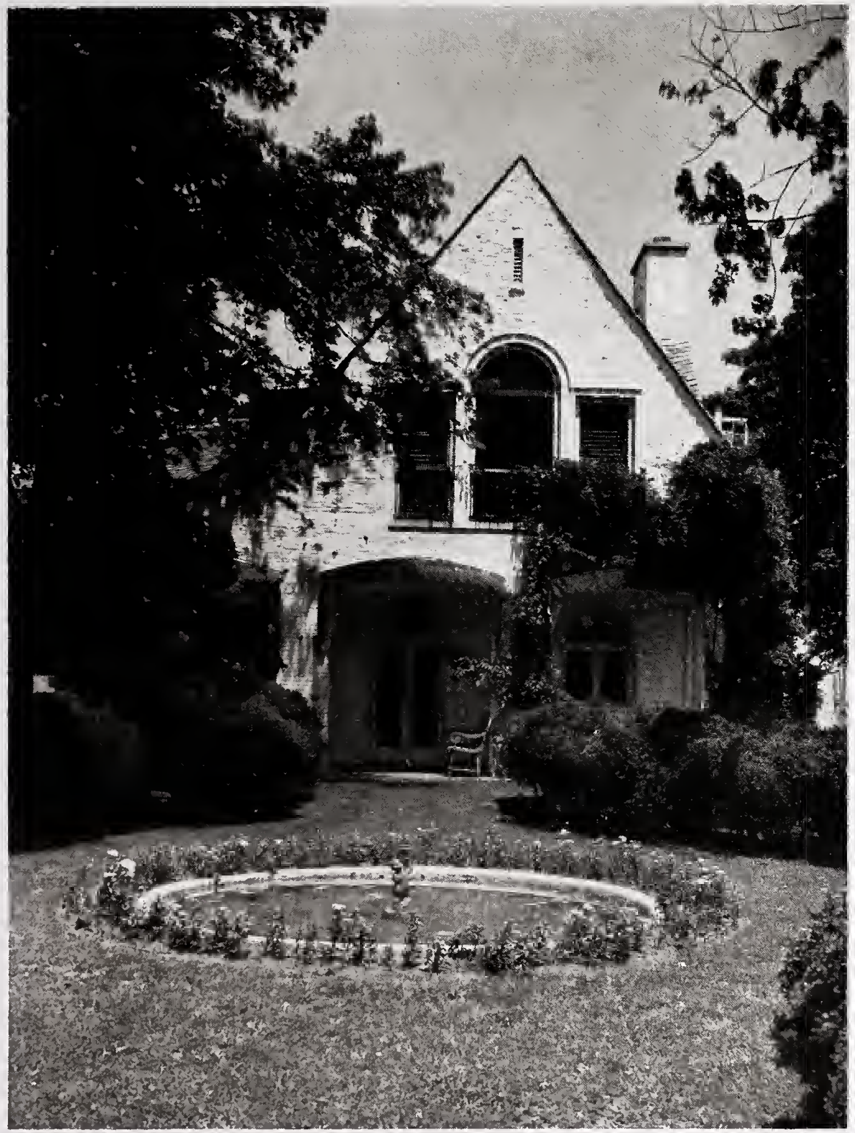

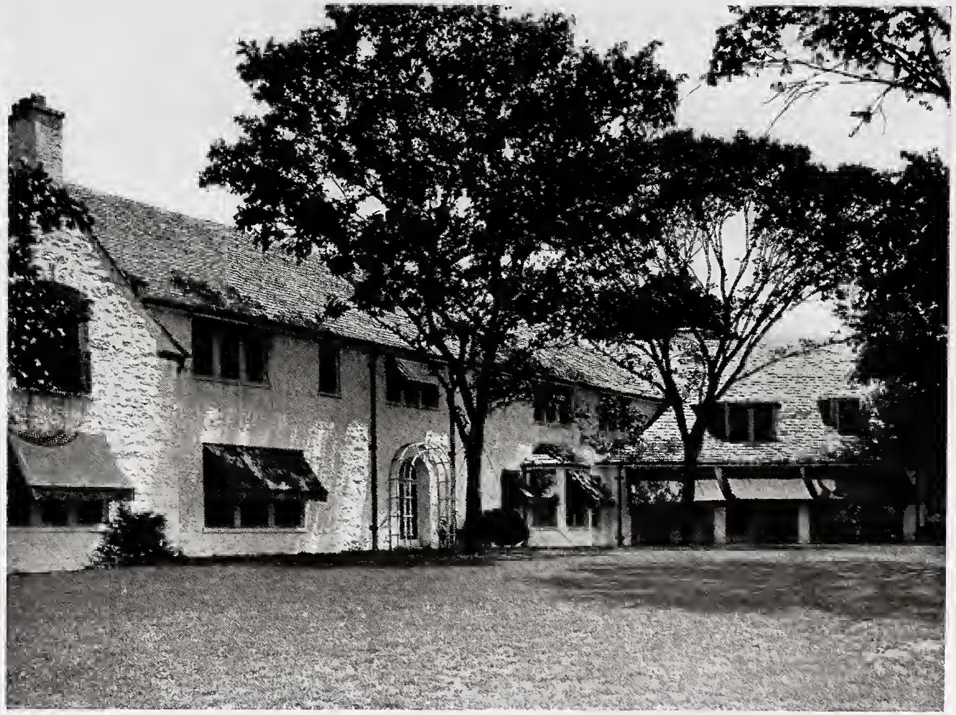

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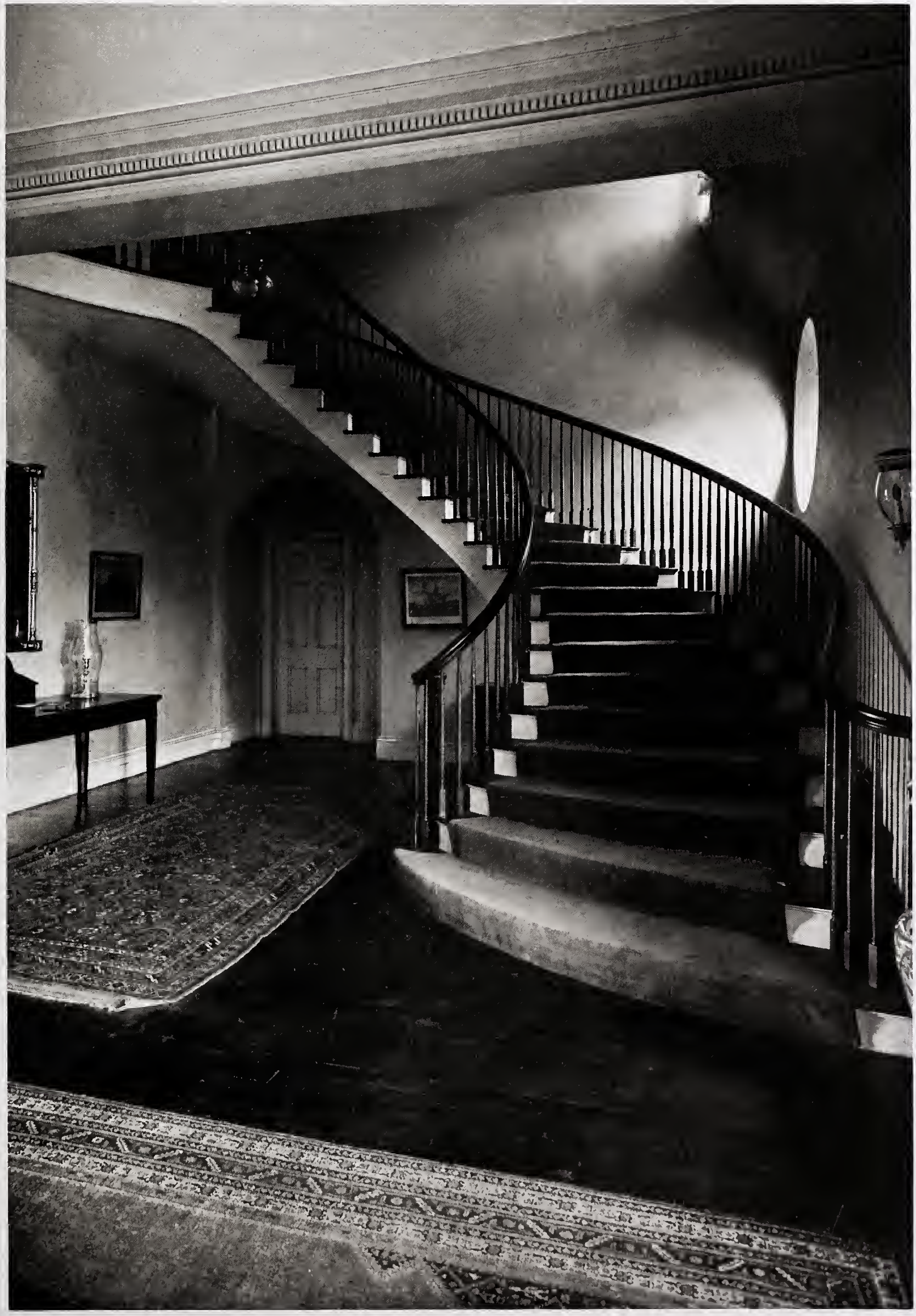
CROSS & CROSS, ARCHITECTS

THE AMERICAN ARCHITECT—THE ARCHITECTURAL REVIEW
VOL. CXXII, NO. 2399 AUGUST 2, 1922



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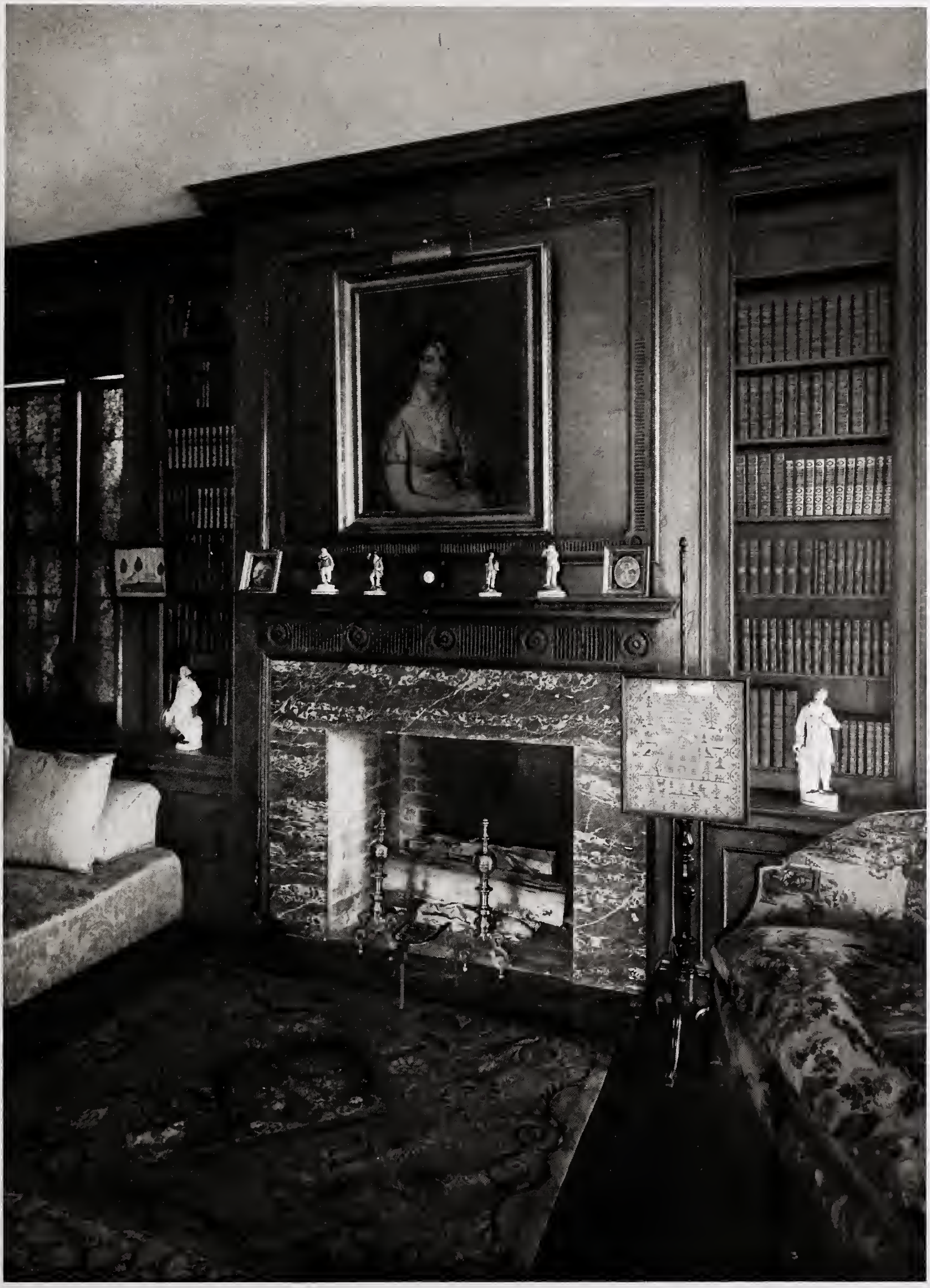

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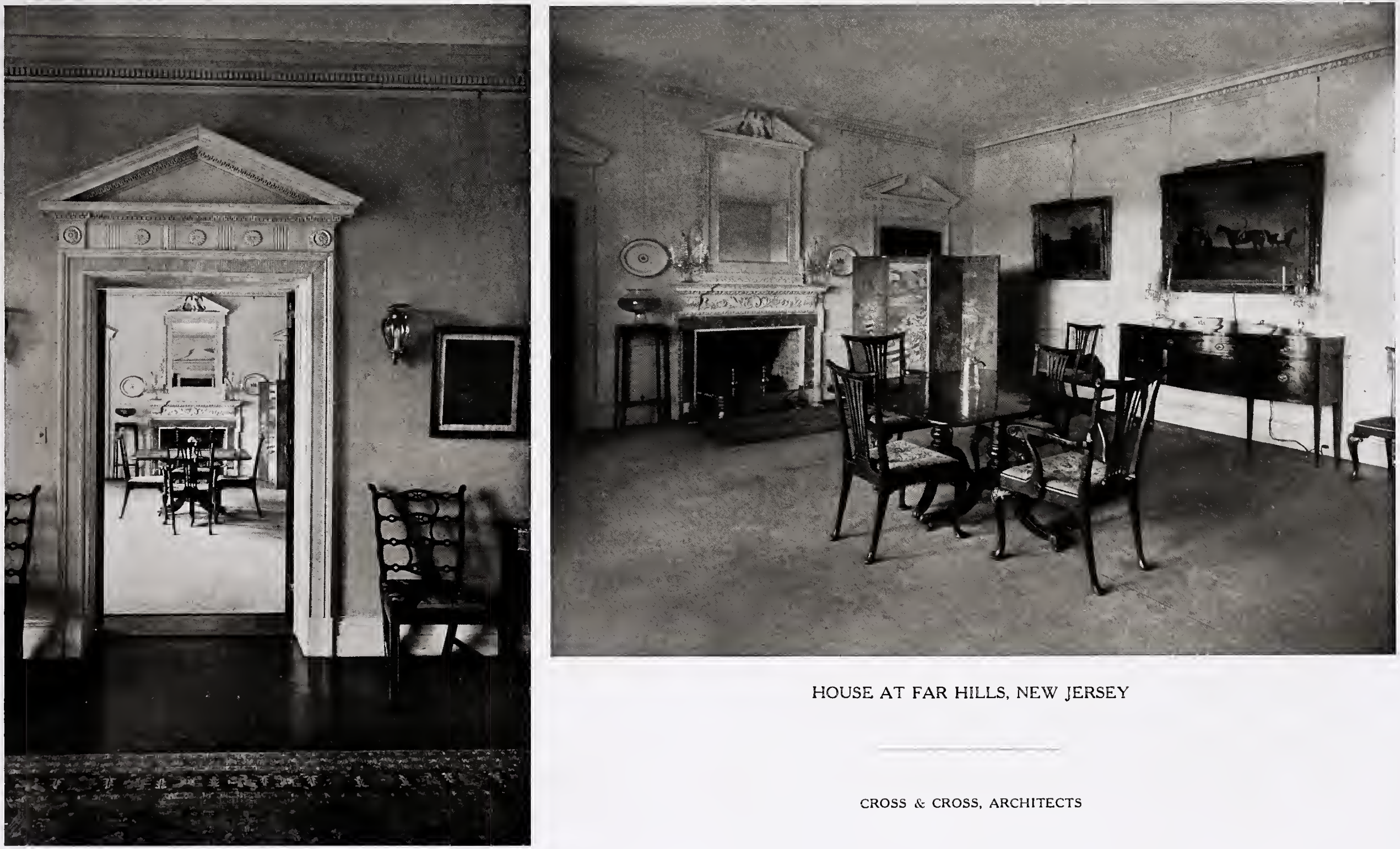

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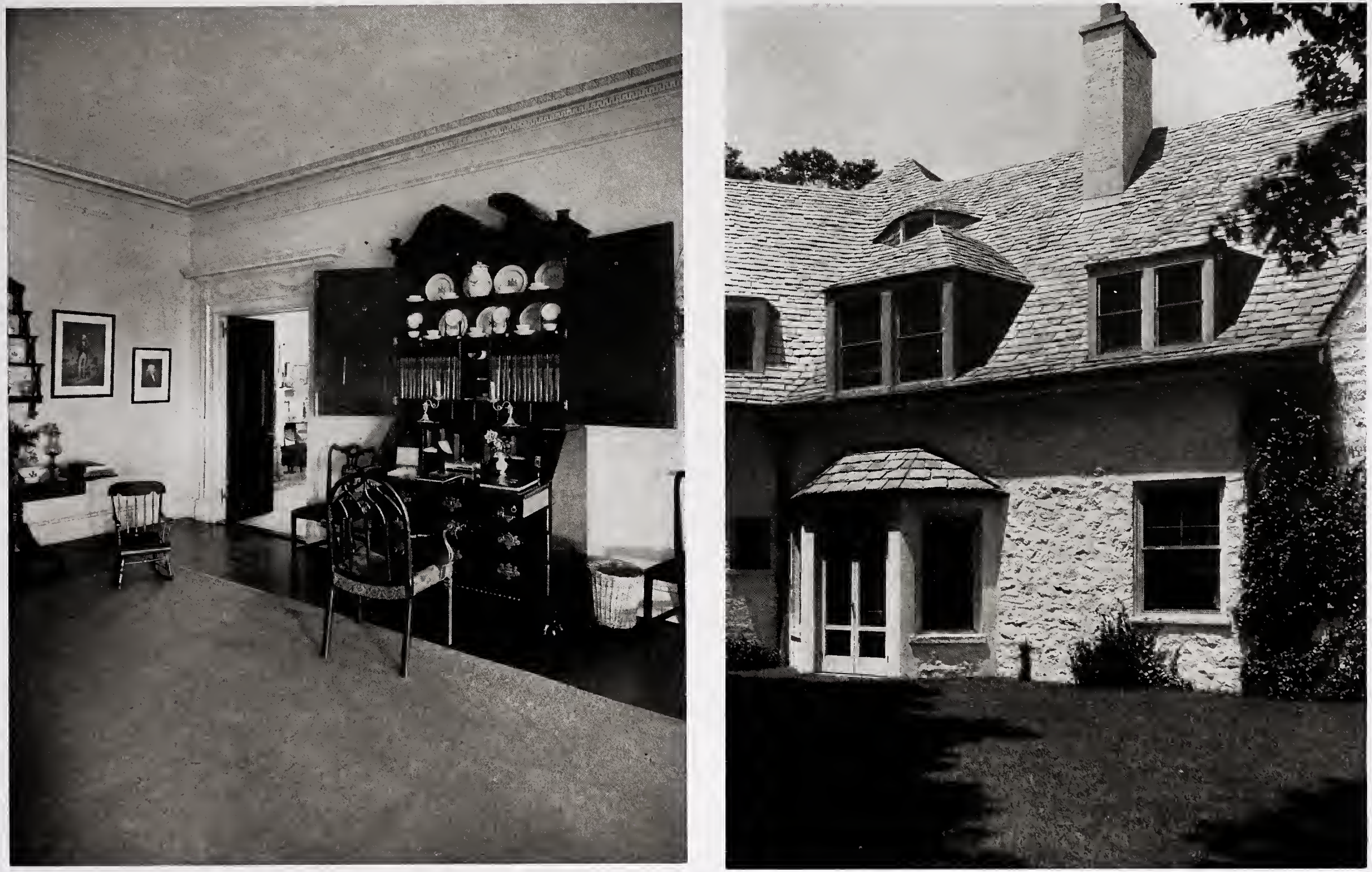
CROSS & CROSS, ARCHITECTS



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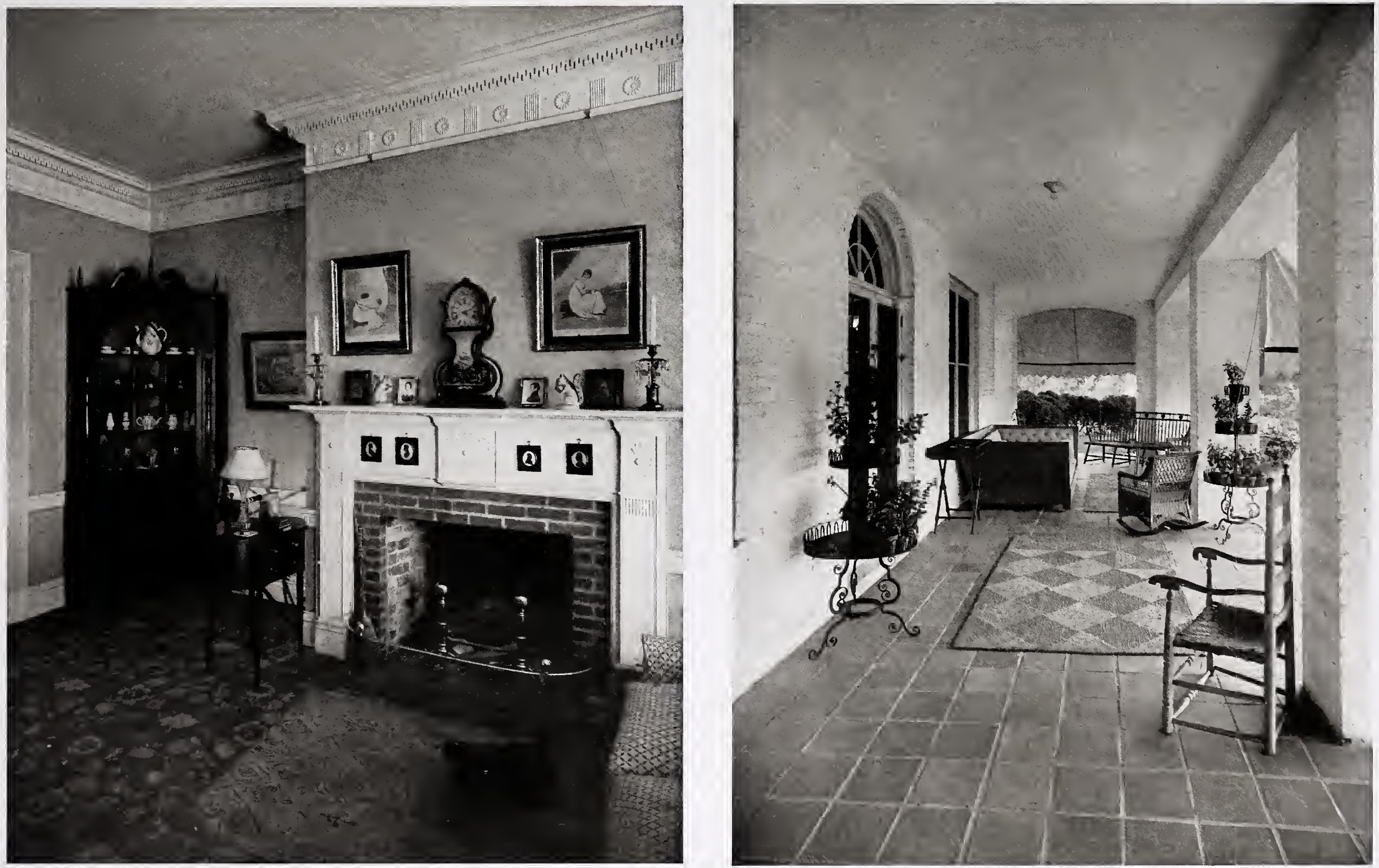

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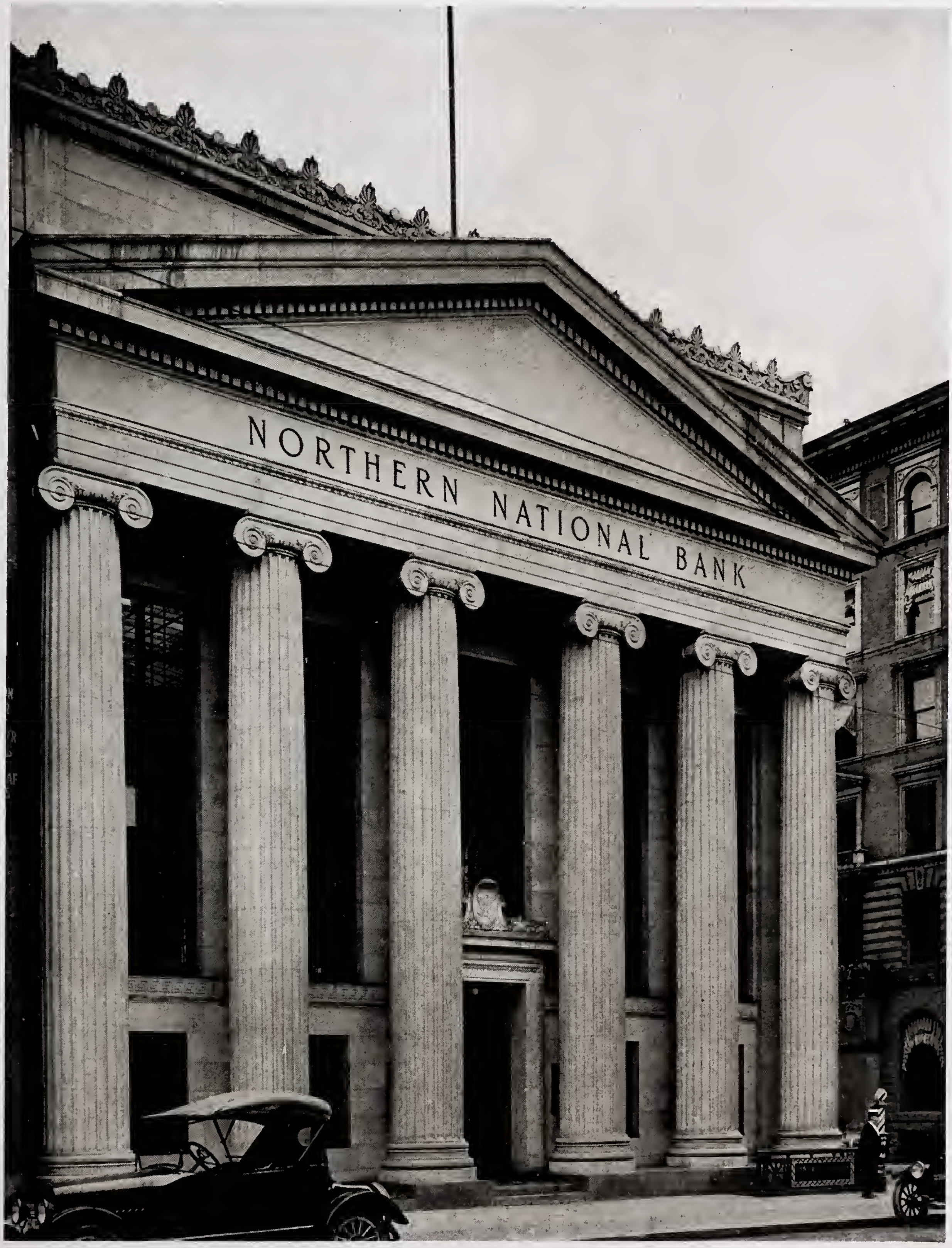
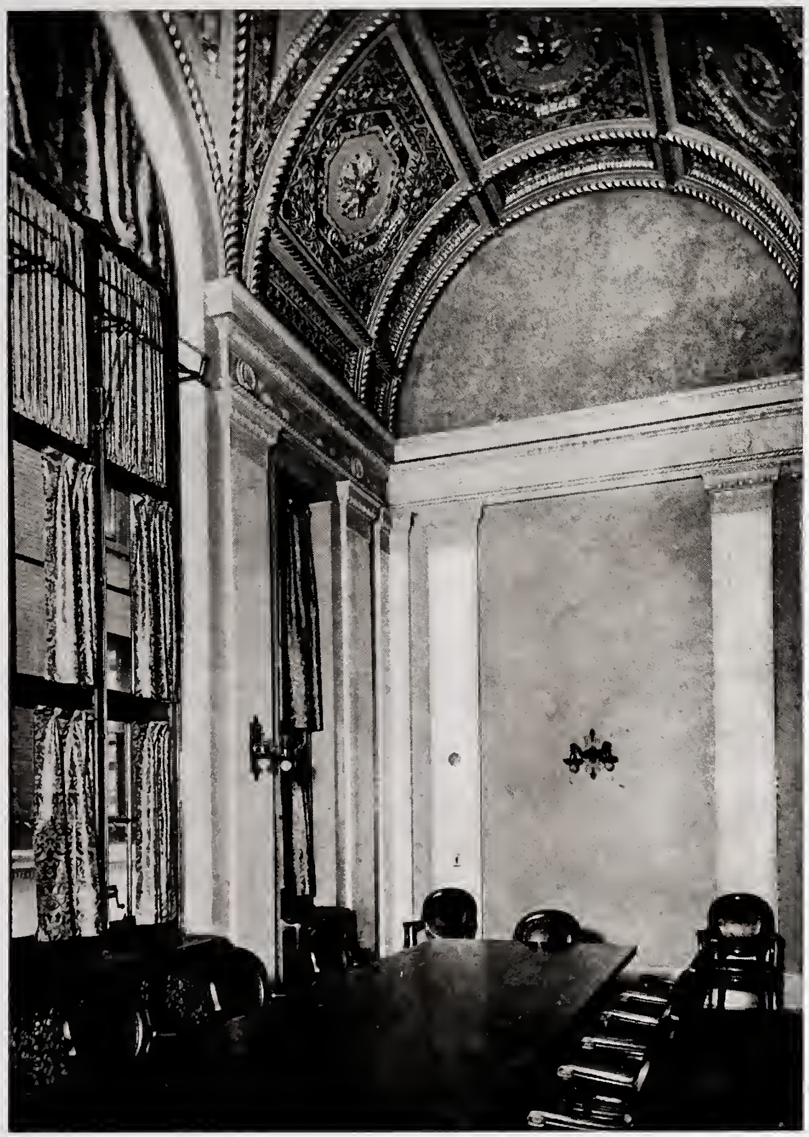
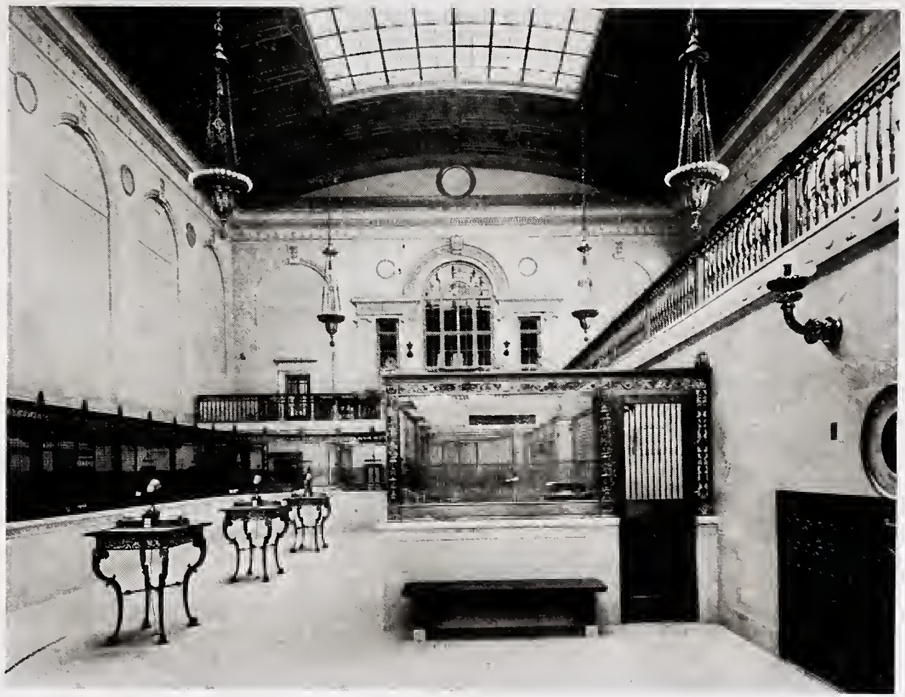


NORTHERN NATIONAL BANK, TOLEDO, OHIO

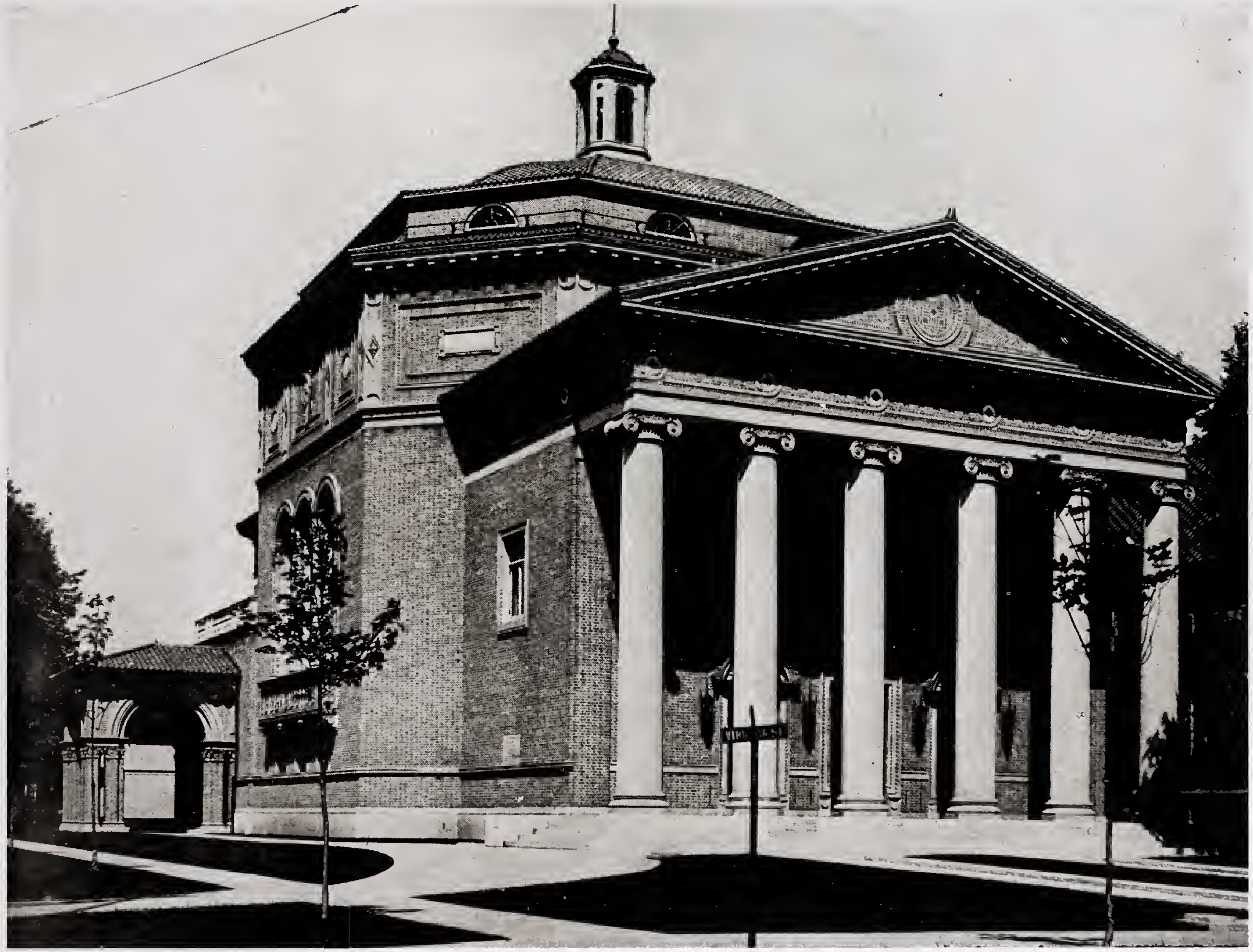
MILLS, RHINES, BELLMAN & NORDHOFF, ARCHITECTS





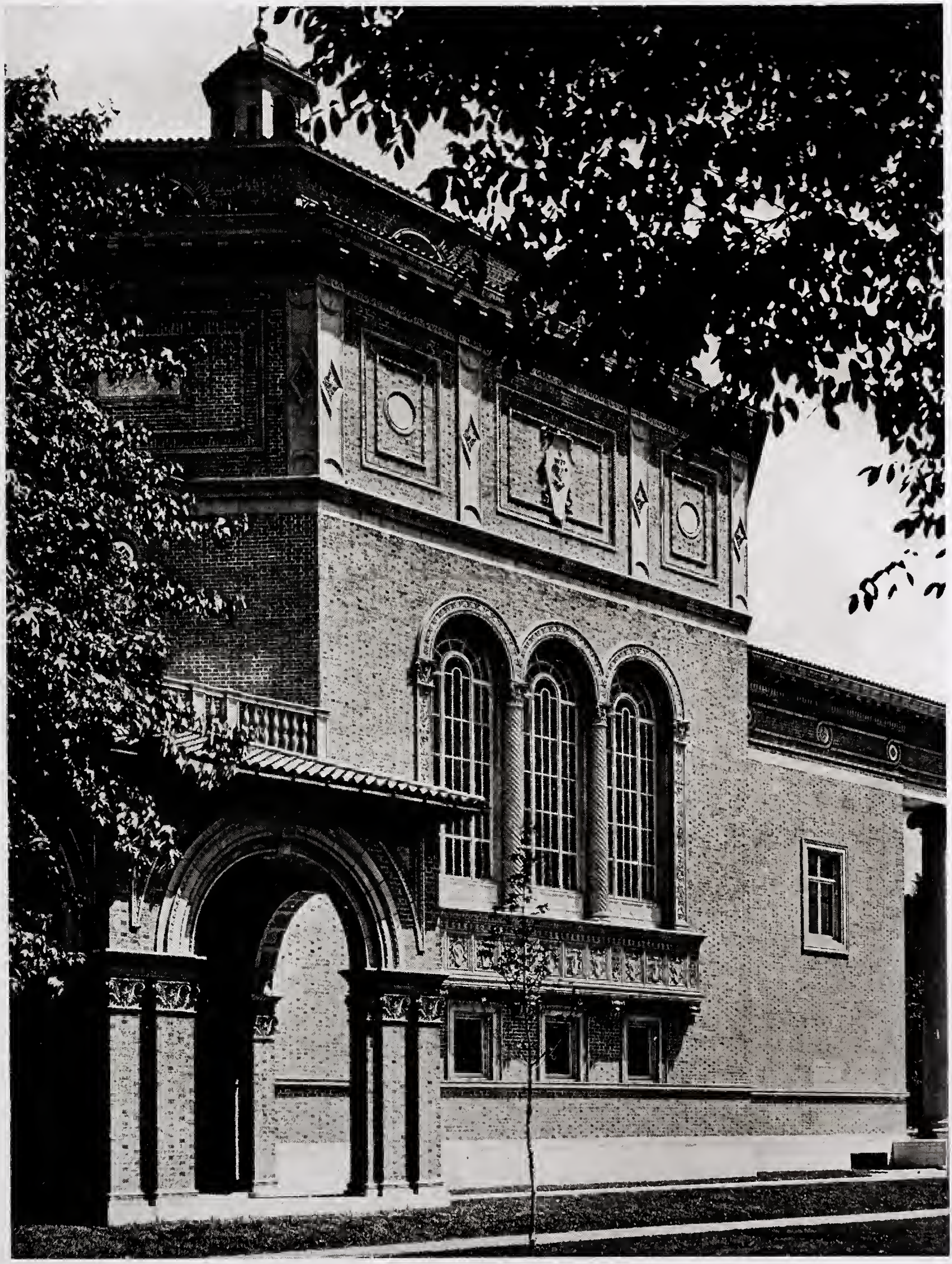
NORTHERN NATIONAL BANK, TOLEDO, OHIO

MILLS, RHINES, BELLMAN & NORDHOFF, ARCHITECTS

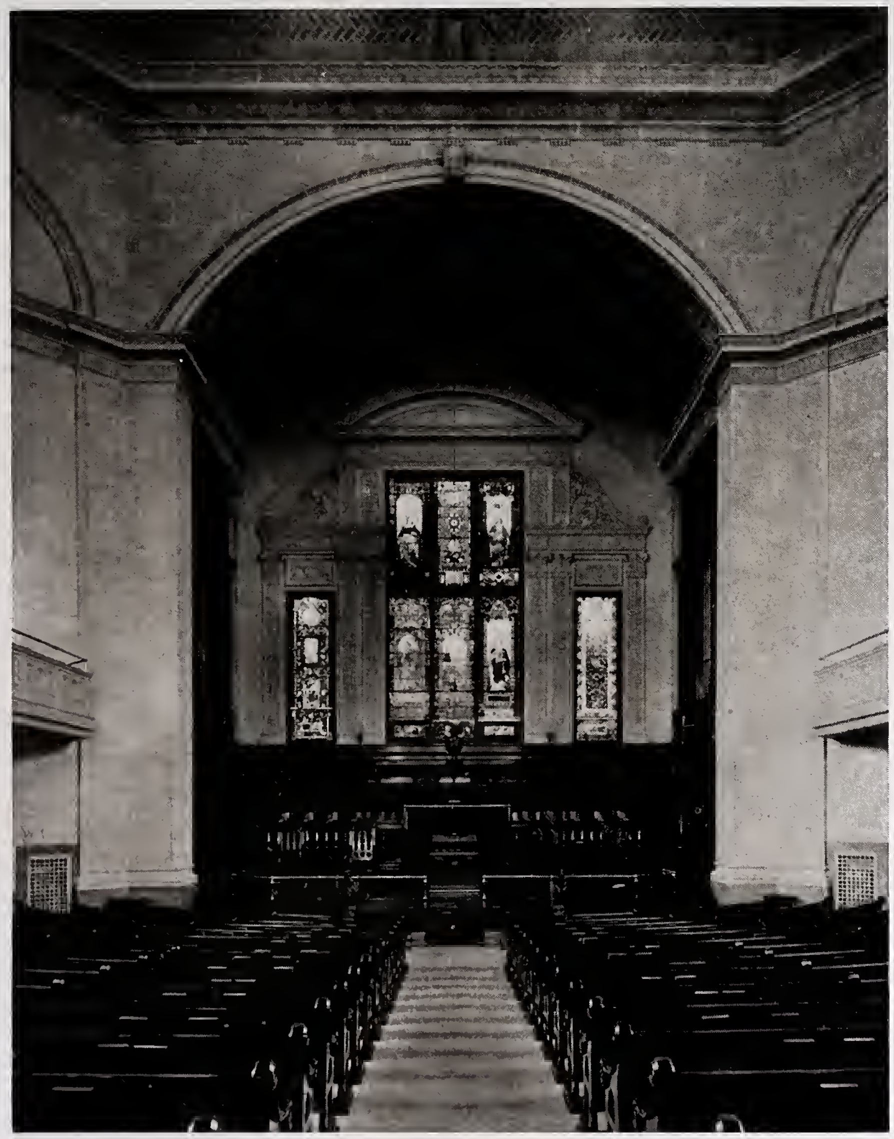


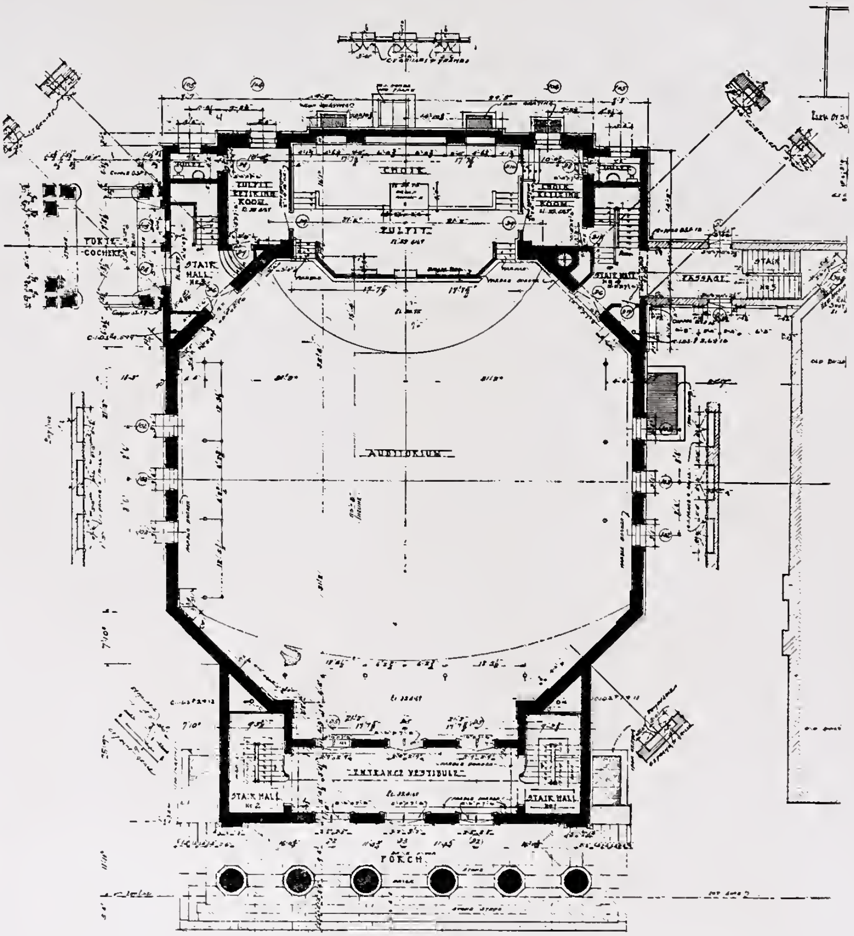
FIRST CONGREGATIONAL CHURCH, TOLEDO, OHIO

MILLS, RHINES, BELLMAN & NORDHOFF, ARCHITECTS



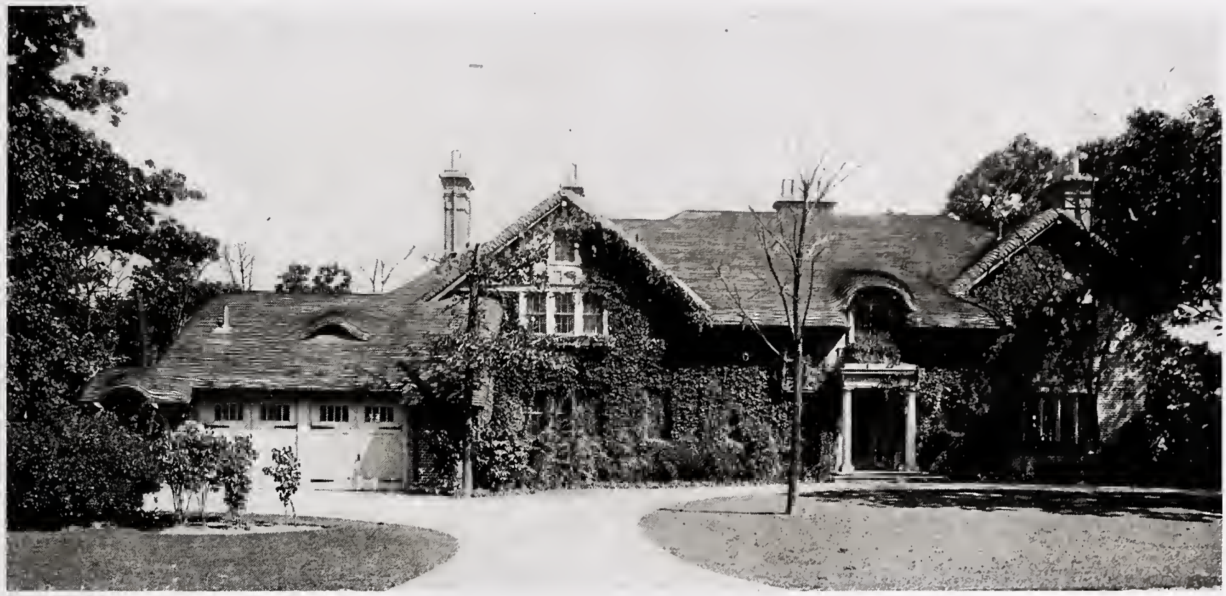
FIRST CONGREGATIONAL CHURCH, TOLEDO, OHIO
MILLS, RHINES, BELLMAN & NORDHOFF, ARCHITECTS

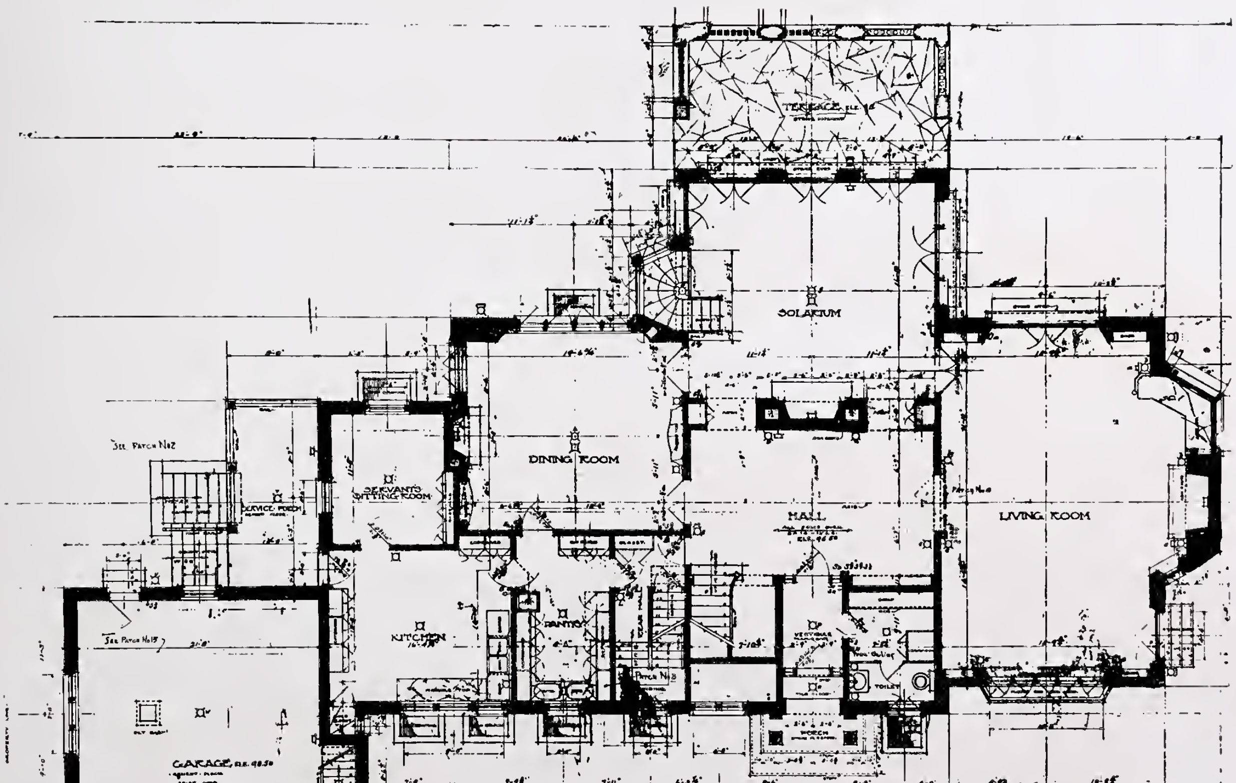




FIRST CONGREGATIONAL CHURCH, TOLEDO, OHIO

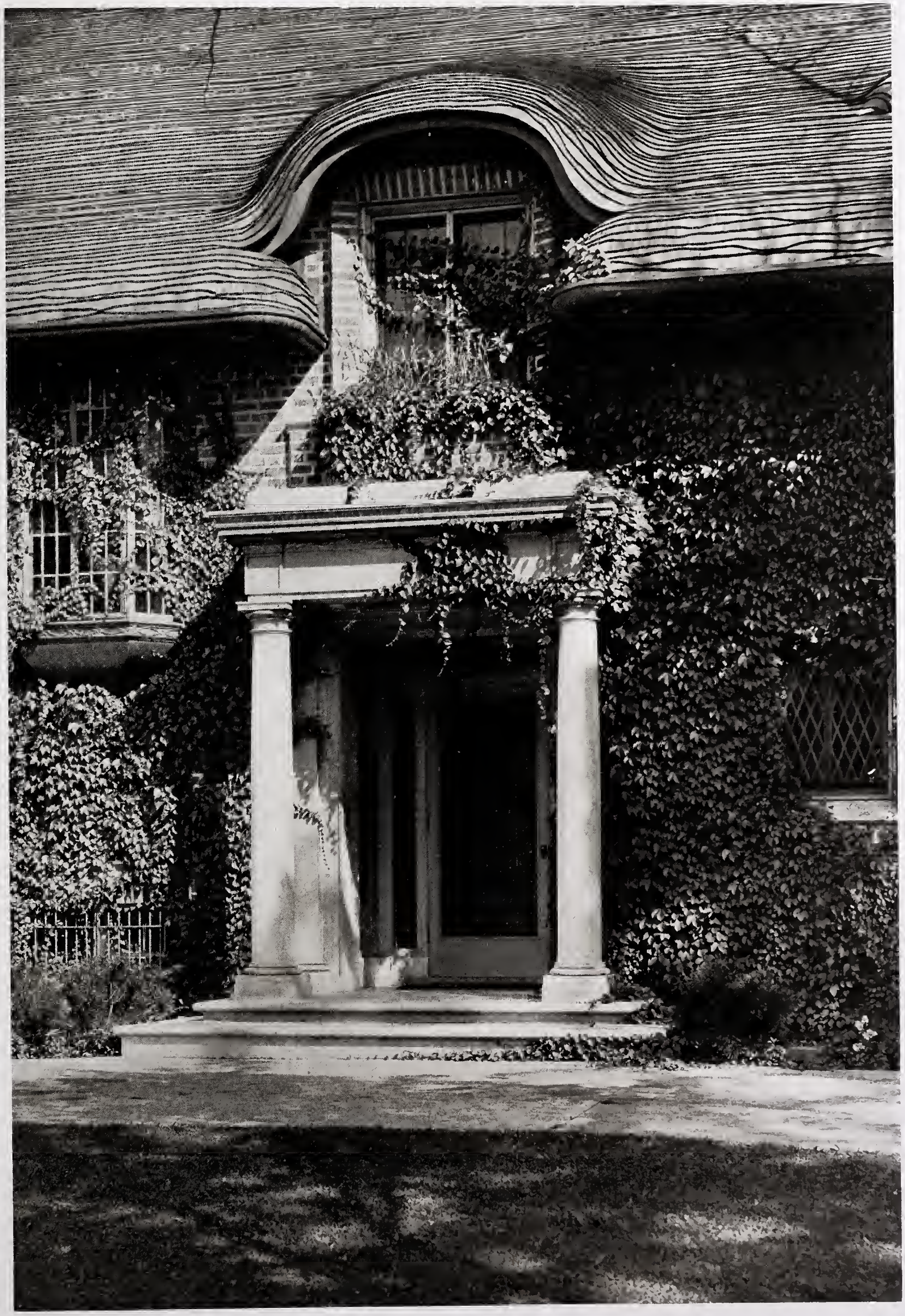
MILLS, RHINES, BELLMAN & NORDHOFF, ARCHITECTS





HOUSE AT TOLEDO, OHIO

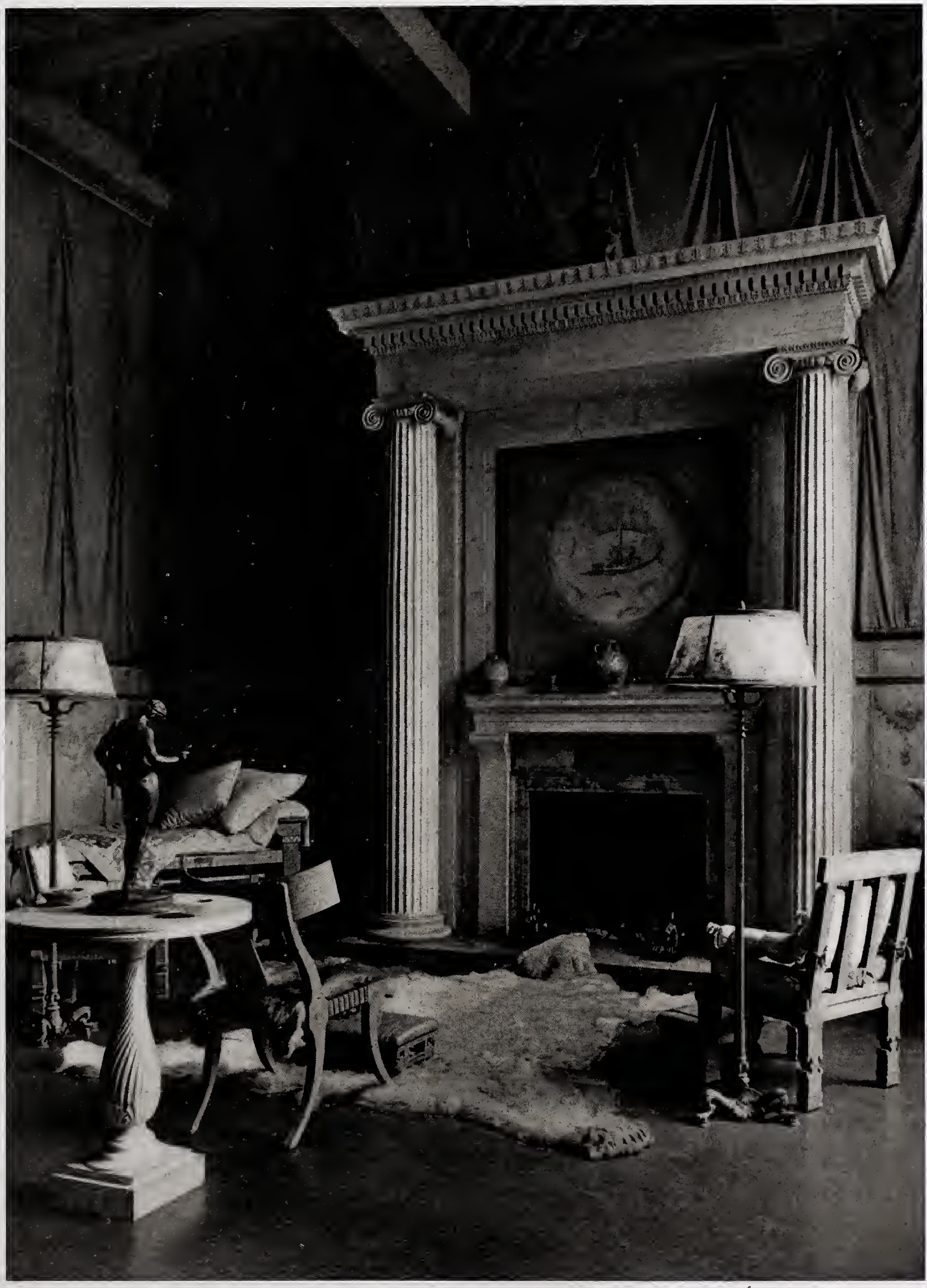
MILLS, RHINES, BELLMAN & NORDHOFF, ARCHITECTS



ENTRANCE DETAIL

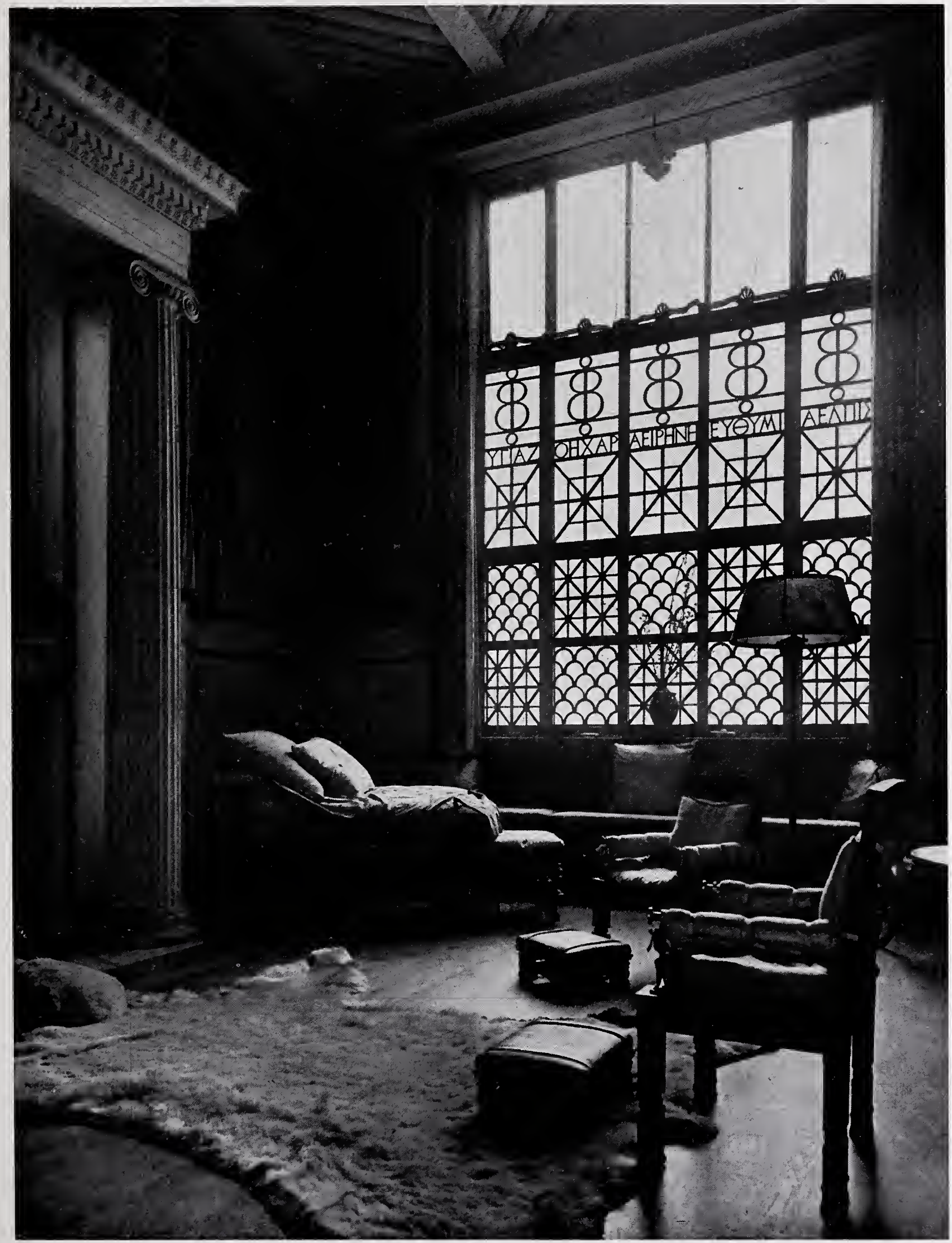
HOUSE AT TOLEDO, OHIO

MILLS, RHINES, BELLMAN & NORDHOFF, ARCHITECTS



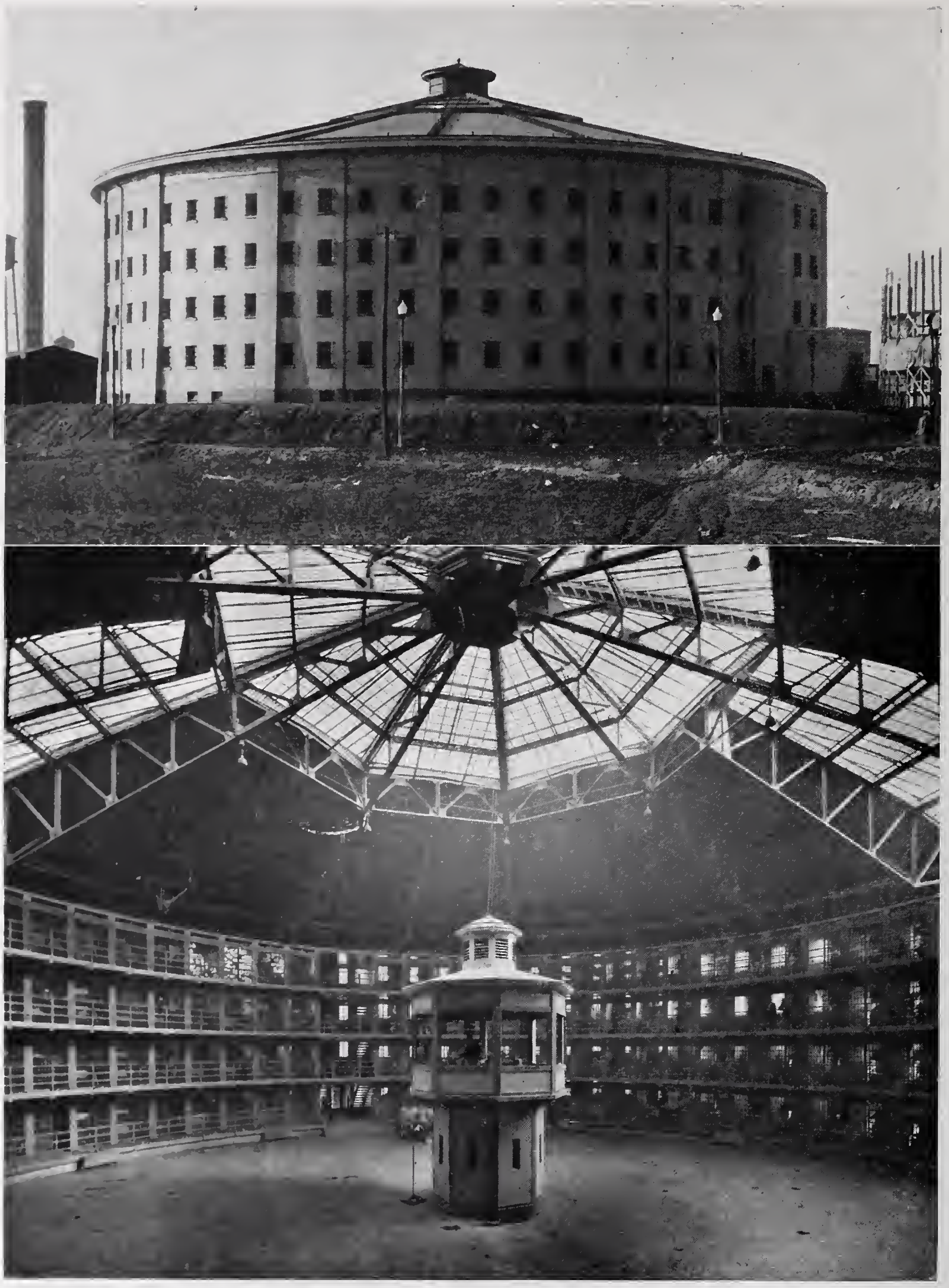
INTERIOR VIEW, HOUSE OF WELLES BOSWORTH

WELLES BOSWORTH, ARCHITECT



INTERIOR VIEW, HOUSE OF WELLES BOSWORTH

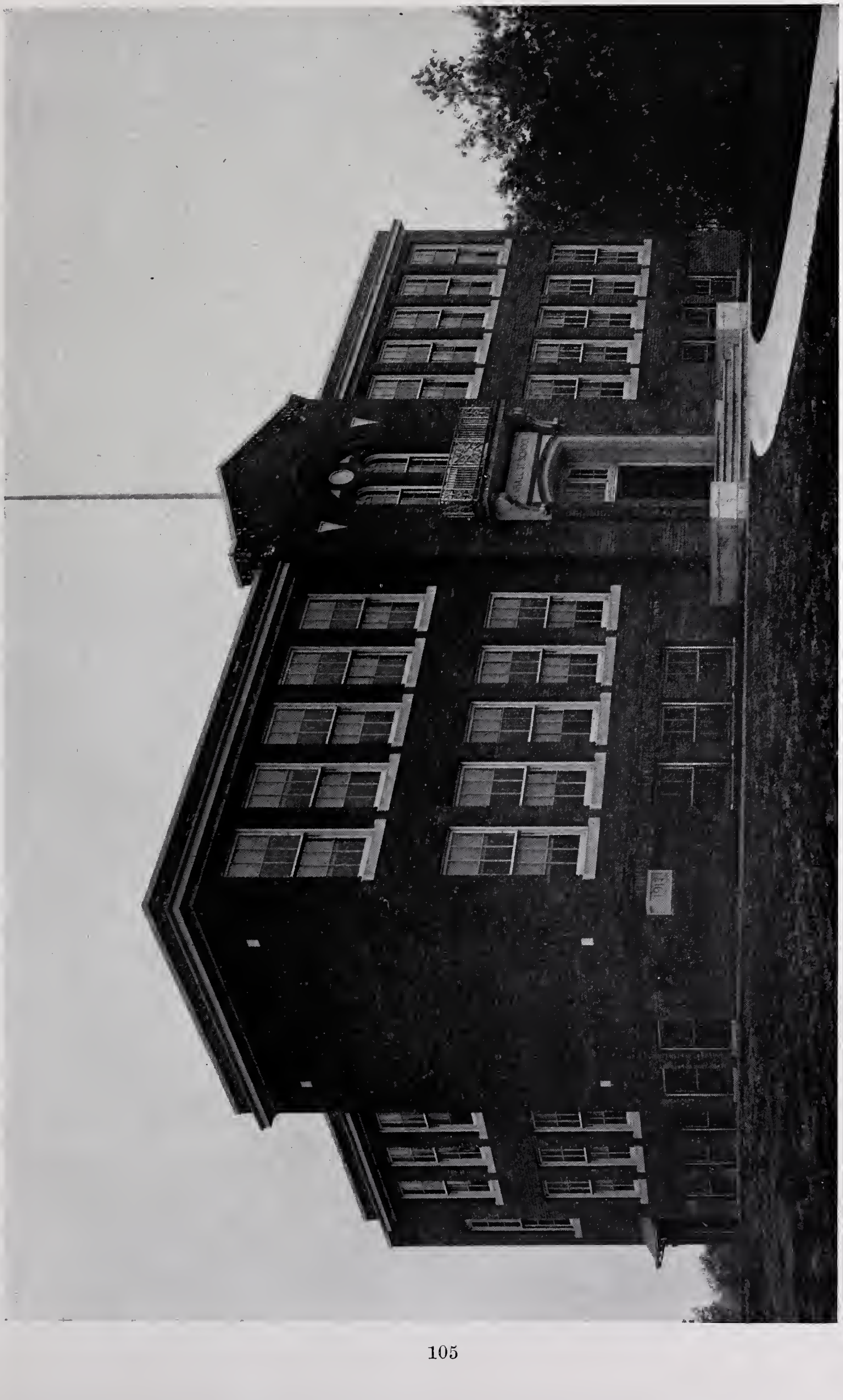
WELLES BOSWORTH, ARCHITECT



NEW ILLINOIS STATE PENITENTIARY

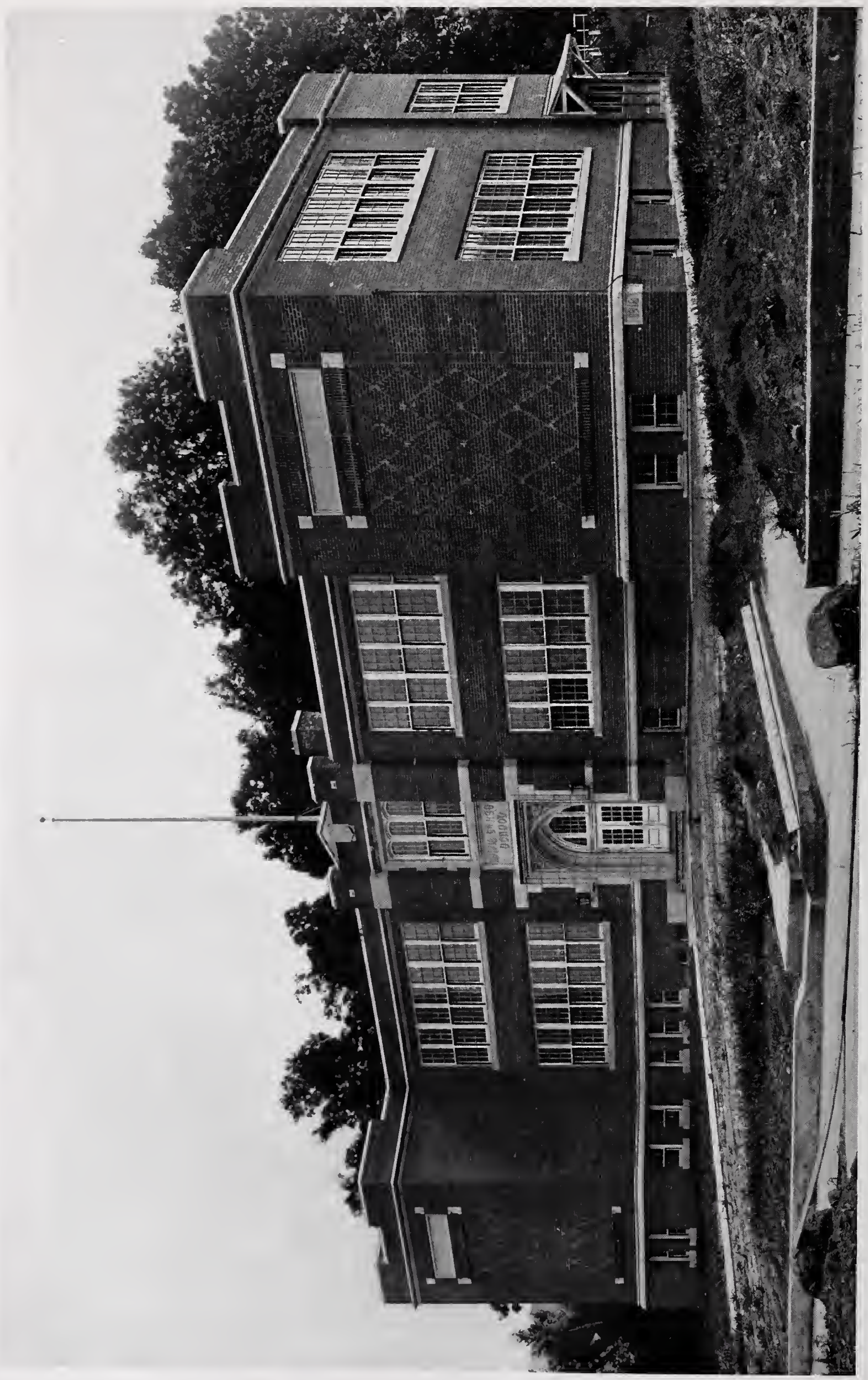
ZIMMERMAN, SAXE & ZIMMERMAN, ARCHITECTS

(*From the Chicago Architectural Exhibition*)



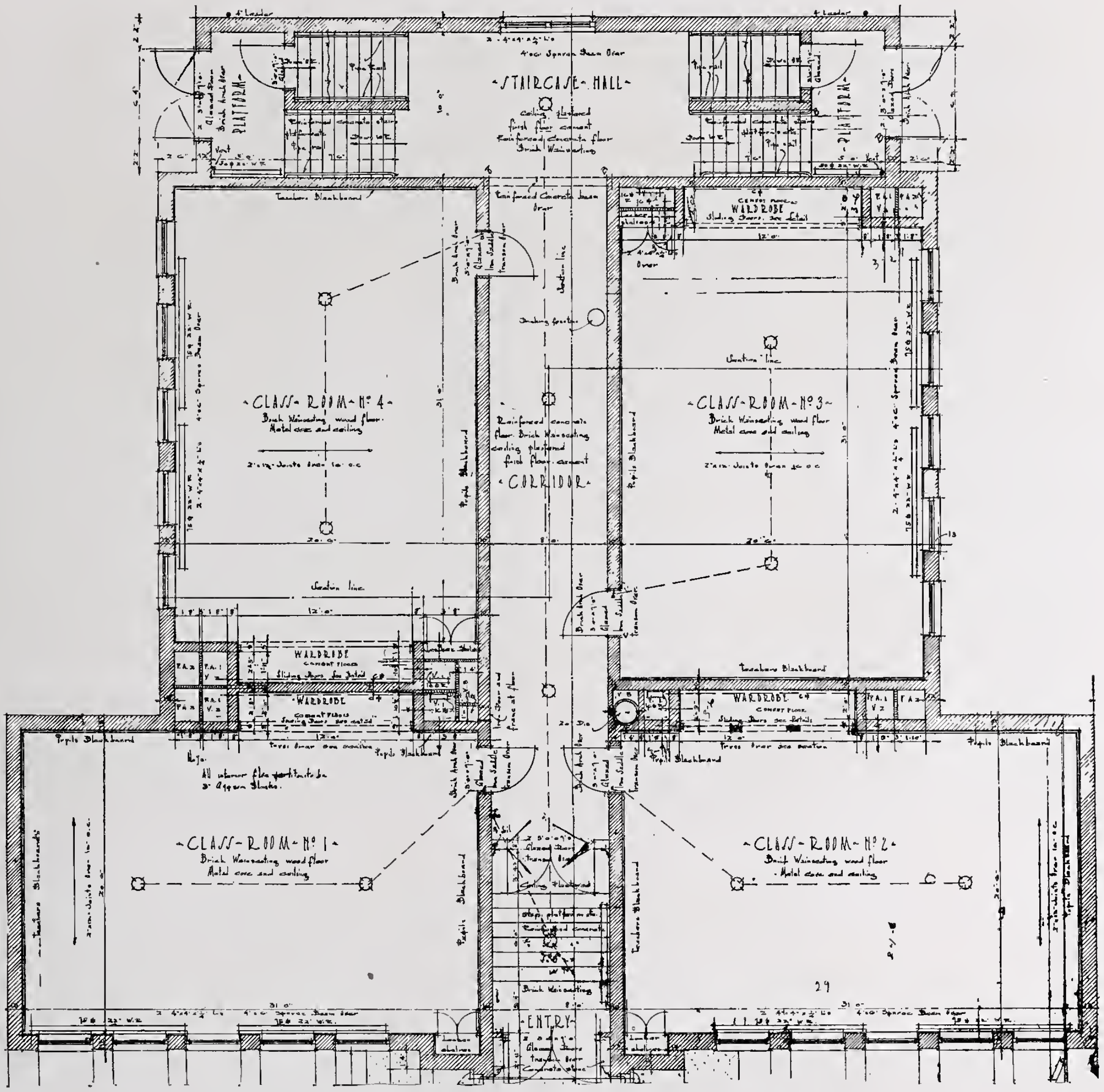
GRAMMAR SCHOOL, HAMDEN, CONN.

BROWN & VON BEREN, ARCHITECTS

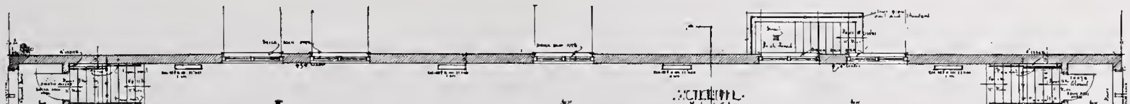


DAVIS STREET SCHOOL, WESTVILLE, CONN.

BROWN & VON BEREN, ARCHITECTS

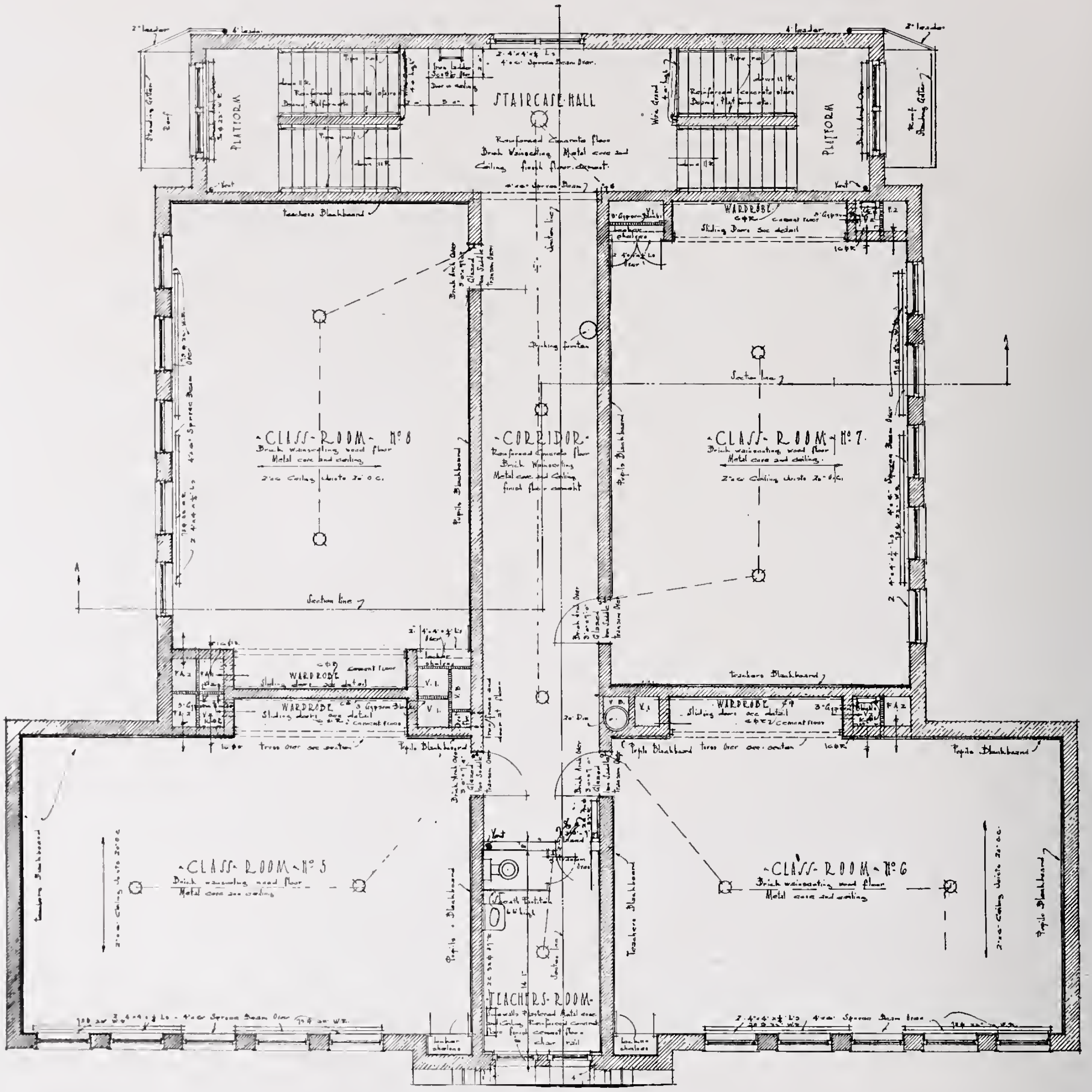


FIRST FLOOR PLAN, GRAMMAR SCHOOL, HAMDEN, CONN.

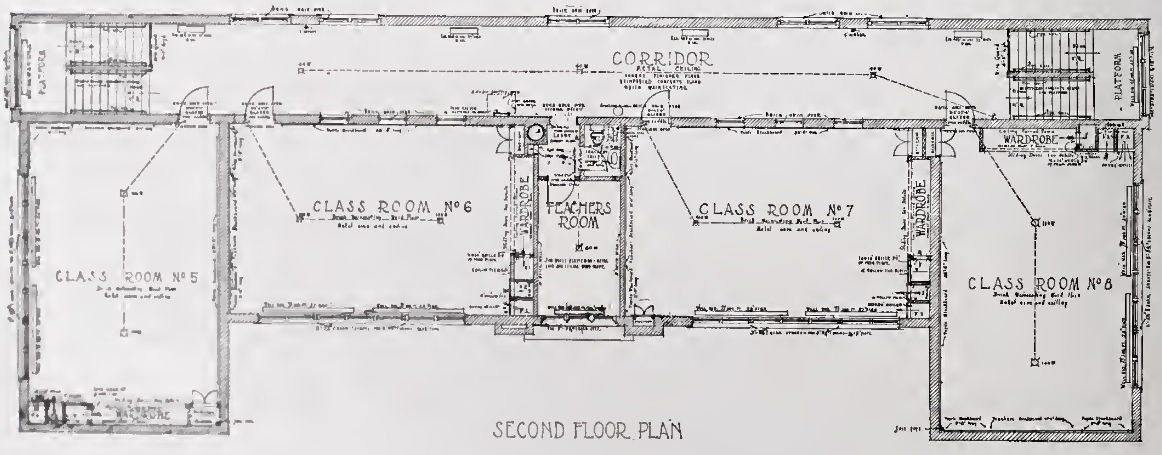


DAVIS STREET SCHOOL, WESTVILLE, CONN.

BROWN & VON BEREN, ARCHITECTS

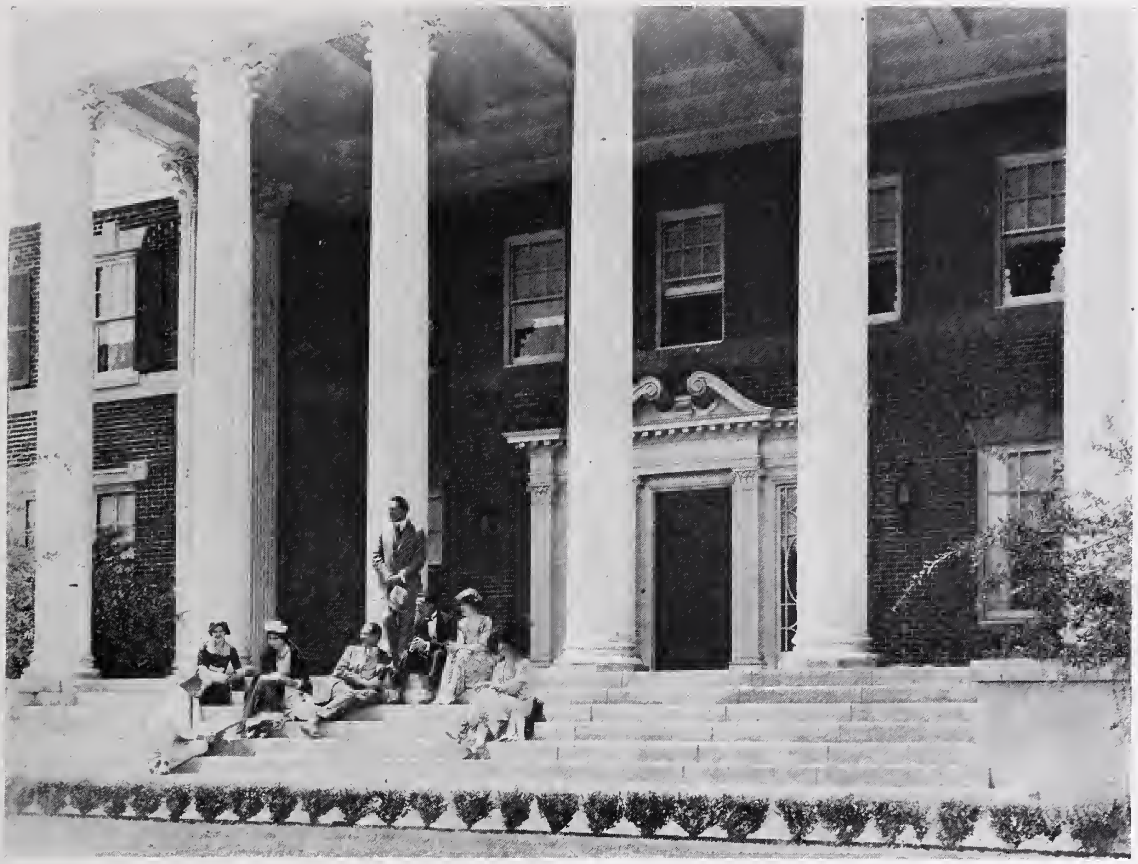


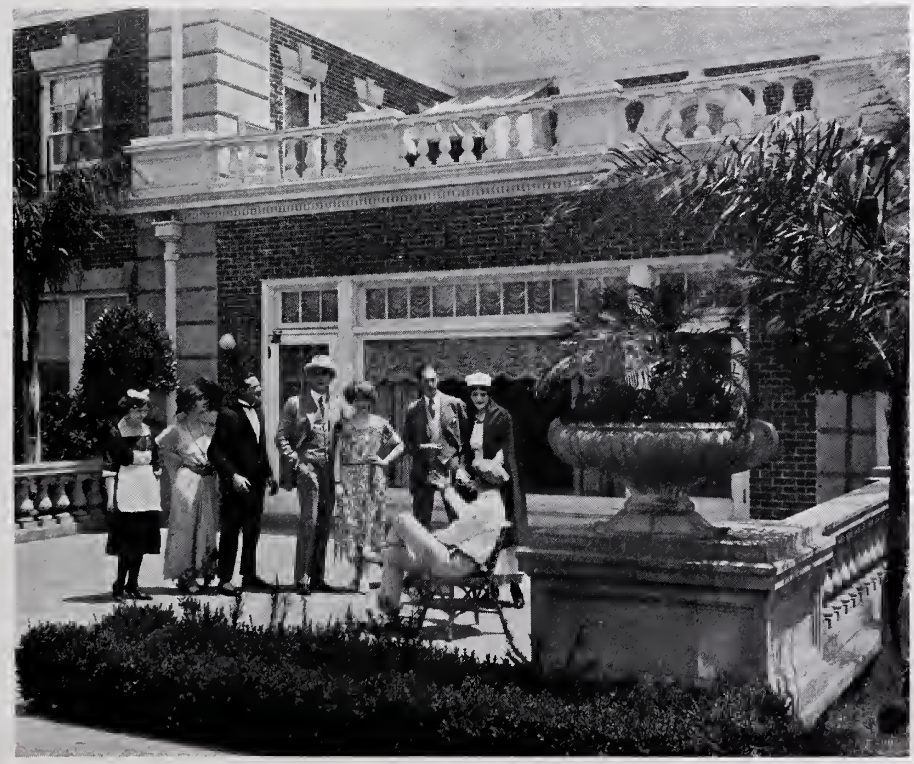
SECOND FLOOR PLAN, GRAMMAR SCHOOL, HAMDEN, CONN.



DAVIS STREET SCHOOL, WESTVILLE, CONN.

BROWN & VON BEREN, ARCHITECTS

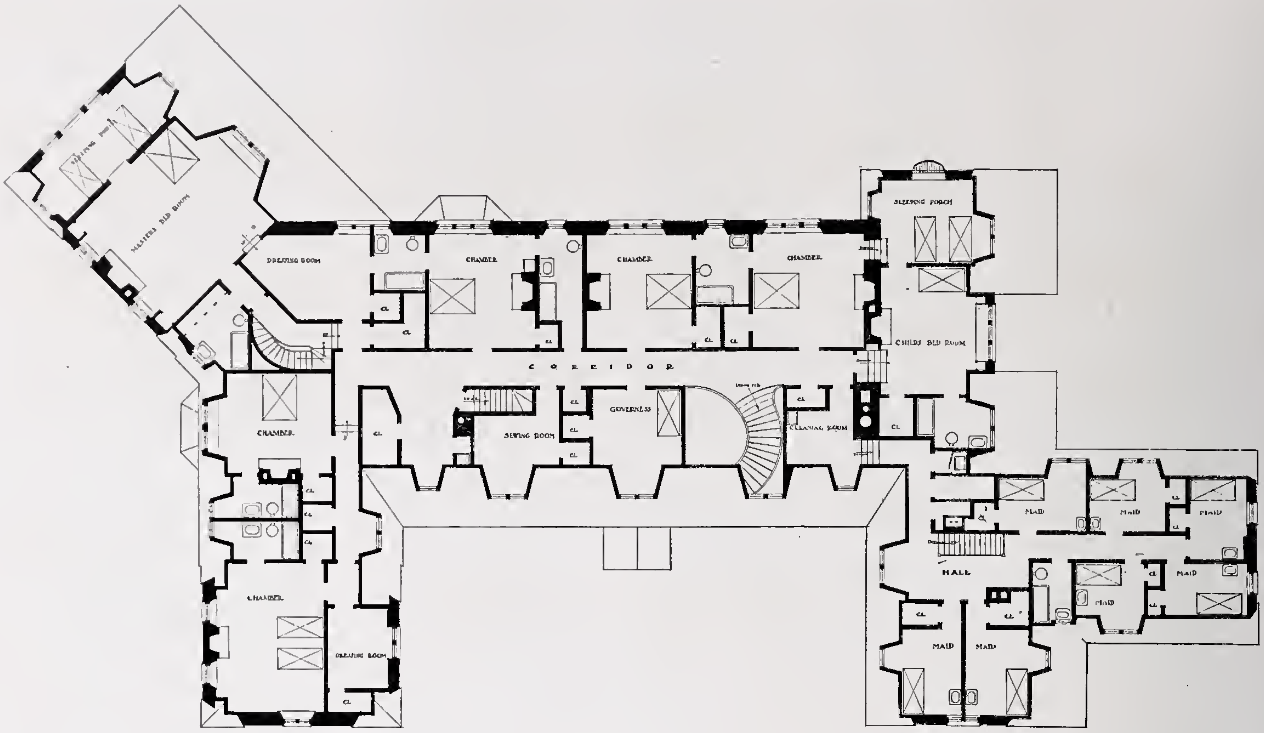




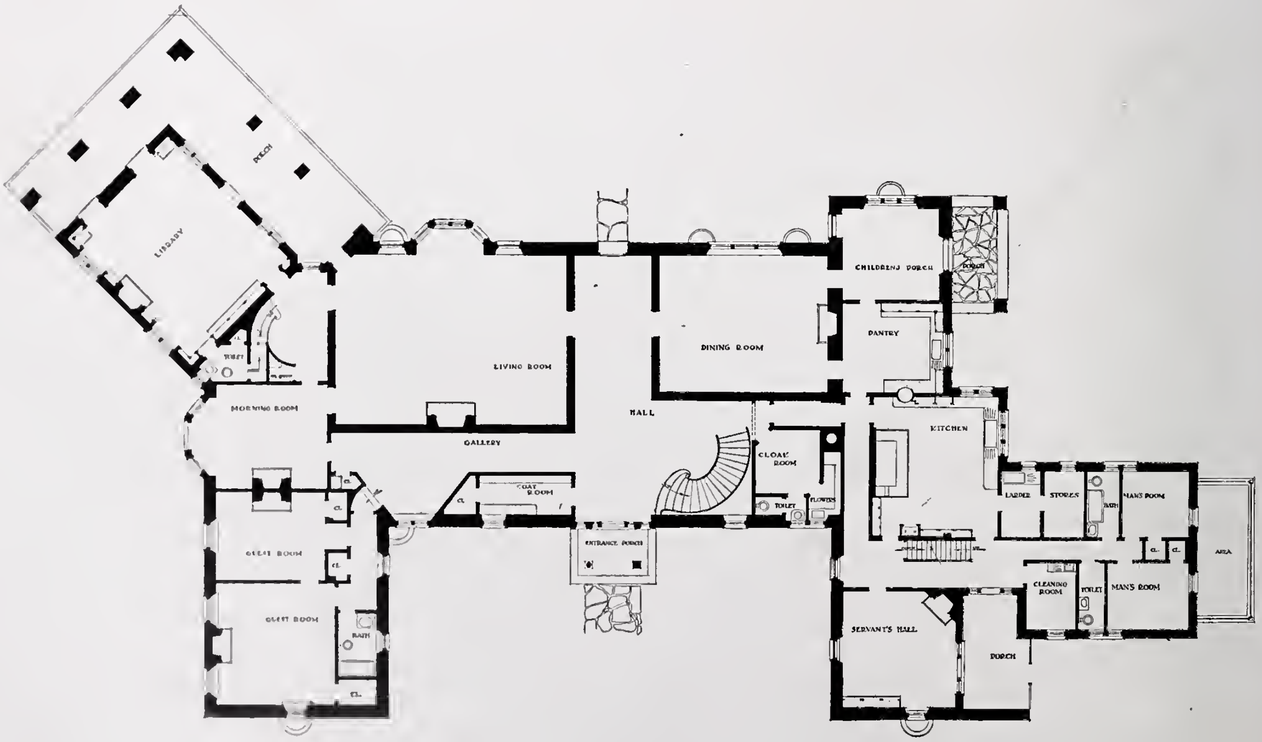
In the above fine example of two dimensional motion picture architecture the massive columns are skillfully camouflaged profile supports and the entire set as viewed in the picture has only a "front" to identify it with architecture.

In the lower picture there is neither stone, marble nor brick. It is built of wood and canvas. Even the trees, plants and grasses are mere decorative effects.

TWO DIMENSIONAL ARCHITECTURE AS SHOWN IN TWO "SETS" MADE FOR A SPECIAL PRODUCTION OF RICH MEN'S WIVES, BY PREFERRED PICTURES, INC., LOS ANGELES, CAL.



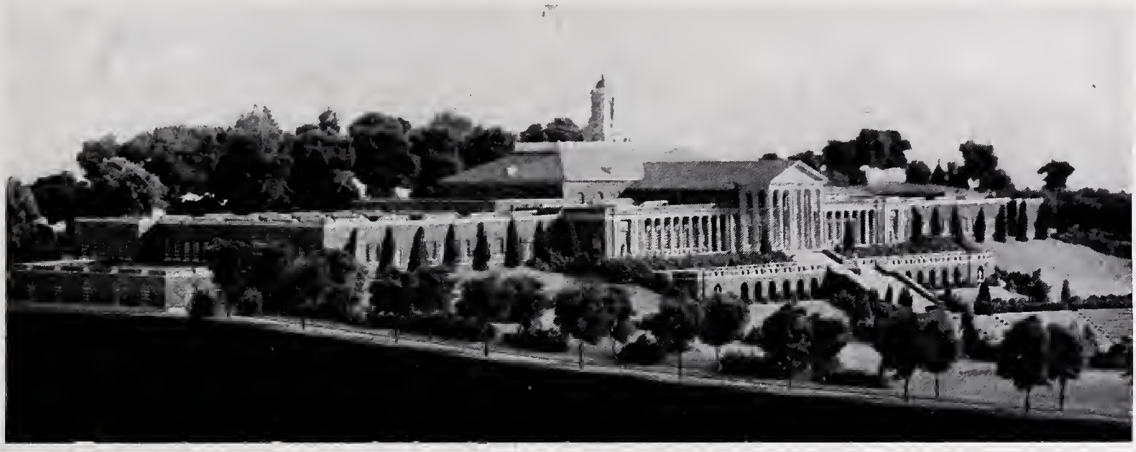
SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE AT FAR HILLS, NEW JERSEY

CROSS & CROSS, ARCHITECTS



Detail of model of The Handley Schools at Winchester, Va.
Walter R. McCornack, Architect
Model is nine feet long, made in three sections at the scale of 20′ = 1″

# CARDBOARD MODELS—I

## BY LEROY GRUMBINE

THE one thing that distinguishes an architect from others engaged in the building business, is that his work must primarily possess beauty and harmony of form and color. The architect is an artist, first and foremost, or he is not a true architect. He works, however, on a different basis from the painter, sculptor, poet, musician, or dramatist. He applies his art, instead of creating it for its own sake. His work has a practical excuse for existing that predominates over its artistic merit. The practical side of architecture gives the weak artist a crutch and places obstacles in the way of architecture that other arts do not have.

The architect, according to the A. I. A. schedule, receives six per cent of the cost of a building, for his services, one-fifth of which is for preliminary studies. It is in the preliminary studies where architecture has its opportunity to express itself as an art. Working drawings, specifications, and superintendence, are almost entirely a matter of engineering. So we find that only a little over one per cent of the money expended on a building is spent for *architecture.* Yet the works of architecture are perhaps more enduring, and are certainly more displayed, than those of any of the other arts. In all the other greater arts, most of the money expended, if not all, is for the art itself. Not even in the lesser applied arts, or in anything where there is an endeavor to make a thing beautiful, is the proportion of money expended for the beautiful so low as in architecture. The reverse ought to be the case, for the more costly and enduring a thing is, the more study it should receive to make it beautiful.

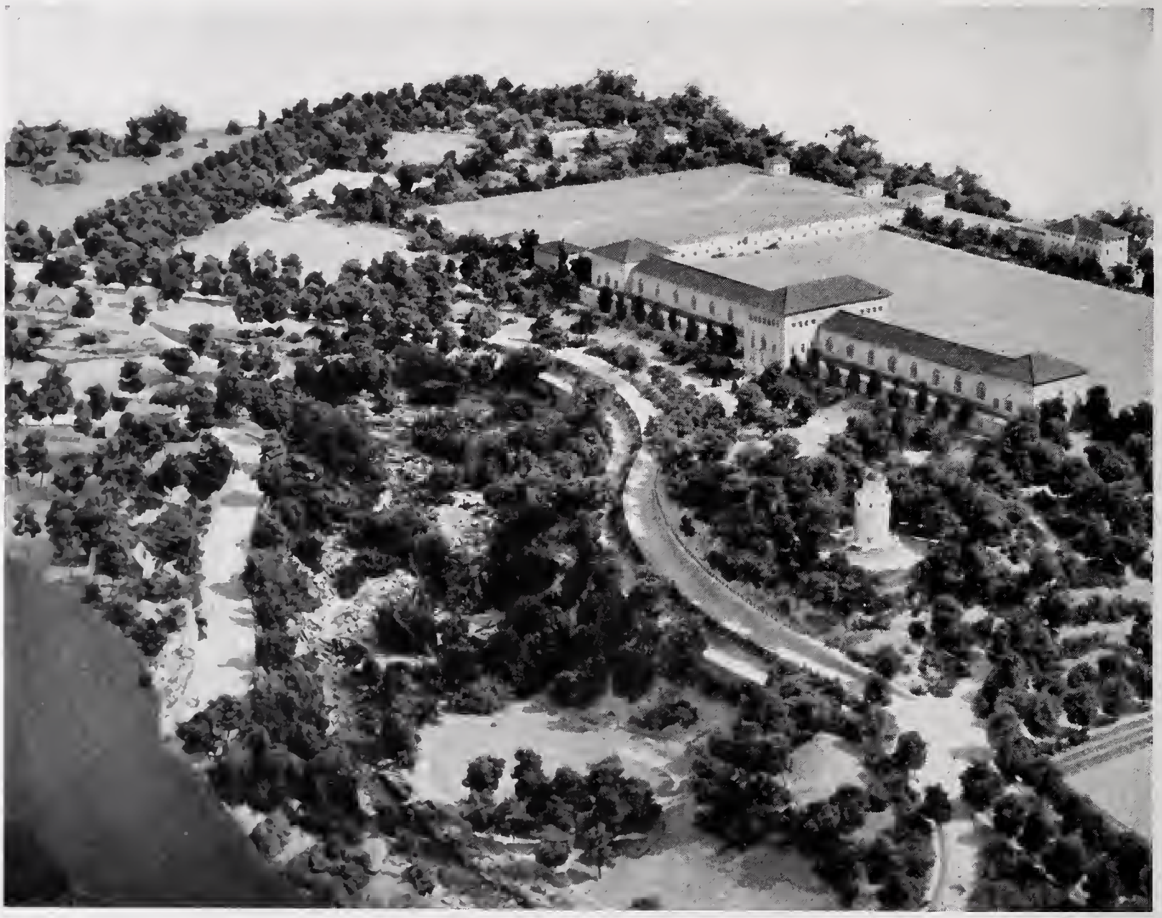
Not only is the architect handicapped by receiving meager returns for his *architectural* services, but he is met with difficulties in selling his work. It is the custom of his profession to sell first and produce afterwards, while the painter, poet, or composer, usually produces first and markets afterwards. This means that the architect is dependent on his reputation, and it is a very slow process for an architect to build up a reputation. It is a long period from preliminary studies to the completed building, and only occasionally does the completed building represent the architect's abilities, for it is seldom that the architect has free play and that his ideas are not more or less marred by the client's commercial instincts and lack of artistic comprehension.

Authorities on salesmanship say that very few people can be sold on reason. By far the great majority are "sold" by appealing to their appetites or senses. The buyer of a painting sees the beautiful picture and wants it. The picture occupies his attention and if he can, he buys it. The most prominent thing that occupies the attention of a buyer of architectural services, is six per cent. The psychological effect is the opposite, and some scab "architect" usually is the gainer, and the owner and neighborhood of the new building, the sufferers.

The usual means of presenting a design to a client, is ambiguous and far from convincing to the lay mind. Even the most thorough presentation in perspective form fails to tell the story completely. The client is undiscerning and suspicious, if not of the architect, then of his own ability to understand the presentations.

Poor designs are often faked, sometimes through carelessness or inability to illustrate correctly, but much too often the reprehensible practice of deliberate "faking" and "dolling up," is resorted to, in order to win the client and land the job. The client sees the fancy drawing, not the design.

Even though the client employs the very best architectural services procurable, personal tastes enter into all arts so largely, that it is the client's right to be shown before he agrees to buy.



Detail of Model of The Baldwin Filtration Plant and Ambler Park, Cleveland—Scale 40′ = 1″

A small portable colored cardboard model is a great assistance in overcoming all these disadvantages. It shows the artistic merits of a design almost, if not quite, as effectively as the completed building. Form, color, relation, proportion, composition, and harmony, are all shown, just as they will appear on the finished building, and these can be studied from every possible viewpoint.

It gives the architect opportunity to express his ideas unrestricted, and to display them to his client. That is, it gives the architect an opportunity to create first and market afterwards.

It appeals to the senses of the client, takes his mind away from six per cent, and focuses it on the article itself, reversing the psychological process from negative to positive.

It gives the architect a means of effectively demonstrating all his talking points.

It makes him less dependent on the necessity for waiting to build up a reputation.

The best design has a much better chance of winning in competition with others, when presented in model form.

A model gives the client confidence because he sees beforehand what he is obligating himself to pay for, and he is therefore much better satisfied.

Models are practical for all kinds of buildings. They need not be expensive, and can usually be made for from one-tenth to one-half of one per cent of the cost of a building, or about what two or three perspectives would cost.

Is it not better wisdom to purchase an article at a store where you can see it first, even though the price is a little higher, than to order it by mail, cash in advance?

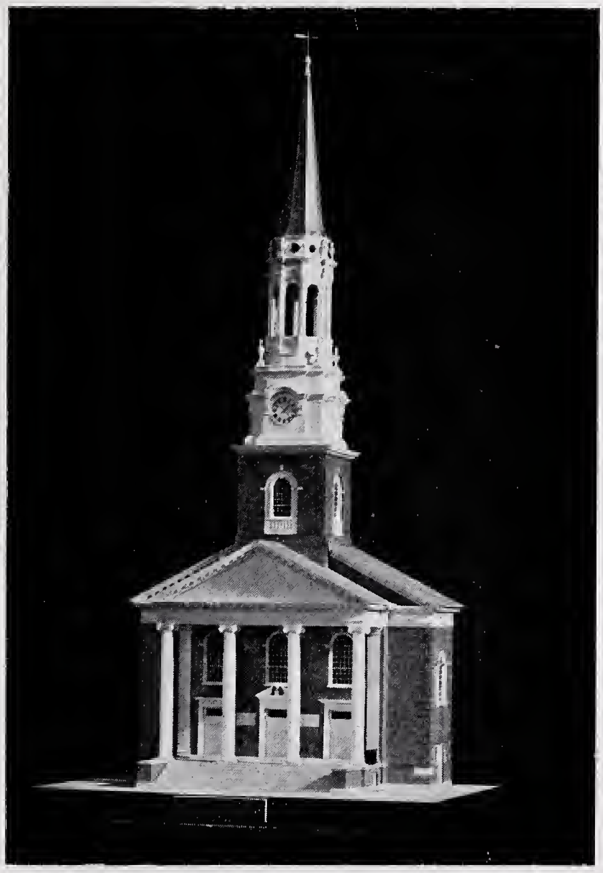
The architect, not the client, should provide the model. It is just as foolish for an architect to ask a client to furnish a model, as it would be for an automobile dealer to ask a prospective customer to pay for a demonstration. Of course the auto buyer pays for the demonstration, but he is not asked to, has no choice in the matter, and does not think about it.

The time is coming very shortly when it will be the customary thing for the architect to illustrate his design for a proposed building, with a small scale model, which, together with floor plans, will constitute his "preliminary sketches."

If the architect displayed his goods rather than the price, to the prospect, he would often be more successful in getting the price. We are living in too fast an age to depend on old-fashioned professional methods and time-consuming reputation building.

The same principles apply to scale model making that apply to drawing and painting. It is not the painstaking literal portrayal of minute details that gives merit to a pencil or water color drawing, but rather the correct relationship of the different parts.

Models should be made by one specially qualified and experienced in the making of models. It is an art in itself and the model maker should be an artist rather than a craftsman. He bears a somewhat similar relation to the architect that a pianist or singer does to a composer. He must know how to interpret the architect's ideas. He must be familiar with drafting room practice and the principles of architectural design and with architectural details. Someone has said that "nothing lies like facts" and this in a way is true in model making. Literal exactness and a multiplicity of details often befog the expression of truth rather than assist it. This does not mean faking or camouflage. Art, in order to be real art, must express a beautiful, noble, or truthful idea, or an experience of life, in a harmonious manner, and he who can do this in the simplest, clearest, most direct way, is the greatest artist. Therefore the modeler must know how to select, what to show and what to leave out, and how to combine.



¼ Scale Model of front of Plymouth Church, Shaker Heights, Cleveland
Charles S. Schneider, Architect
Constructed entirely of cardboard except that the columns are made of plaster, the urns of wood and the windows of celluloid

Color is as important as form. A model that is not properly colored, does not correctly illustrate the design.

Models, like drawings, can be studies, sketches, or exhibits. A study model is for the architect himself, or for the architect and client. It is made in the simplest and quickest way, and as far as possible, so it can be altered. Permanence is not considered.

Sketch models show just enough to illustrate the essential features. If properly made, they can be just as artistic as sketch drawings. They are useful to present designs of buildings of moderate cost, or two or more models can be made of the same building, showing alternate designs.

An exhibition model is made of a design that the architect has satisfied himself is the best solution, to exhibit in a more or less public way. The model is made in a more painstaking way and more complete in detail.

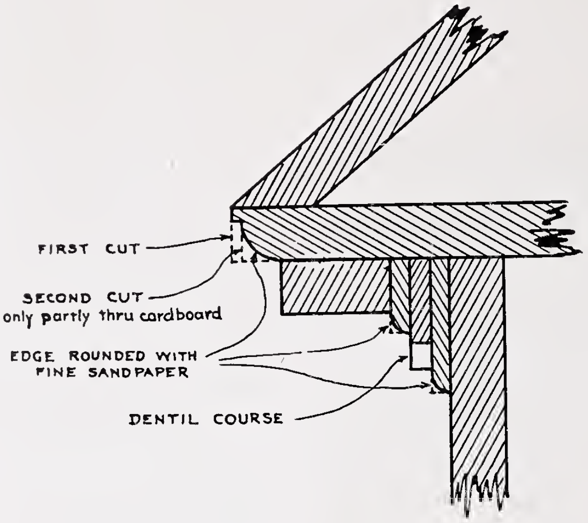
A study or sketch model is made to develop the building as it is to be; an exhibition model to get the order to proceed.

Models might be classified according to their subjects, as building, landscape, group, interior, and detail. Here again a model is like a picture, and it is a mistake to try to show too much on one model. It is less expensive and more effective to illustrate two ideas with two different models than to try to show both on one model.

A model of a building should be between one and two feet long. Its purpose is to show the general design, composition, proportion, mass, central feature, color, etc. Only a few inches of grounds should be included.

A landscape model should not be over three feet wide. One-sixteenth or one-twentieth of an inch to the foot is usually the most practical scale. For extensive grounds, smaller scales should be used.

Sometimes it is advisable slightly to increase the vertical scale of the grounds, to give a more true effect for gullies, valleys, or hills, but this must be done with caution, or incongruities will result, especially where there are buildings. For detail work and formal gardens one-eighth or three-sixteenth inch scale works very well. A larger scale makes it difficult to show trees.


FIRST CUT
SECOND CUT only partly thru cardboard
EDGE ROUNDED WITH FINE SANDPAPER
DENTIL COURSE

METHOD OF BUILDING UP A CORNICE
DRAWING ABOUT FOUR TIMES ACTUAL SIZE

There is nothing gained by making a group plan model over four feet wide.

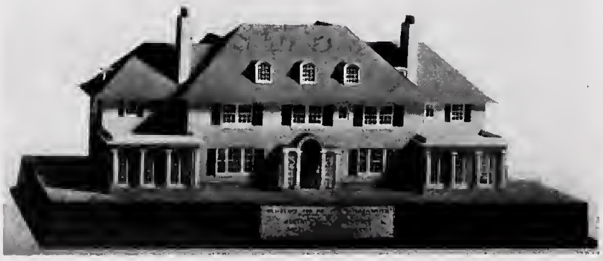
Group plans and landscape models do not show architecture nearly so completely as individual models of the buildings, because many important views are cut off. For group plans, study models are especially valuable, and much work can be saved the architect. The various units can be moved about forming all possible arrangements, in a much shorter time than to make drawings of the various schemes.

When it is desired to illustrate the details of some particular feature, such as a doorway or cornice, it is much more practical to make a separate detail model of this portion at a larger scale, than to execute the entire building at a scale large enough to show the detail. It is a useless extravagance of labor to duplicate a modillion a hundred times, or a window trim forty times.

Although the interior and exterior of a building can be combined in one model, less labor is involved and better results are obtained by making two separate models. A model showing the interior of an auditorium, theatre, or church, should be constructed in six sections, so that each one of the four walls and the ceiling can be removed independently, leaving the other five sections intact. Such a model need not be over two feet long. This gives every possible viewpoint of the whole interior, and is much superior to the usual method of having an expensive and cumbersome plaster model made, where one has to crawl under and stick his head up through a hole in the floor, and then only obtains views from one point, and no check on the seating arrangement is afforded.

Cardboard modeling is an art that is still in its infancy. It is receiving a lot of attention and the near future will undoubtedly see a marked development. As soon as the public — the artistic public—learns that it is practical for architects to furnish scale models with preliminary sketches, it will demand that they do so, and will choose the architects that furnish them even if their fees are higher.

(*To be continued*)



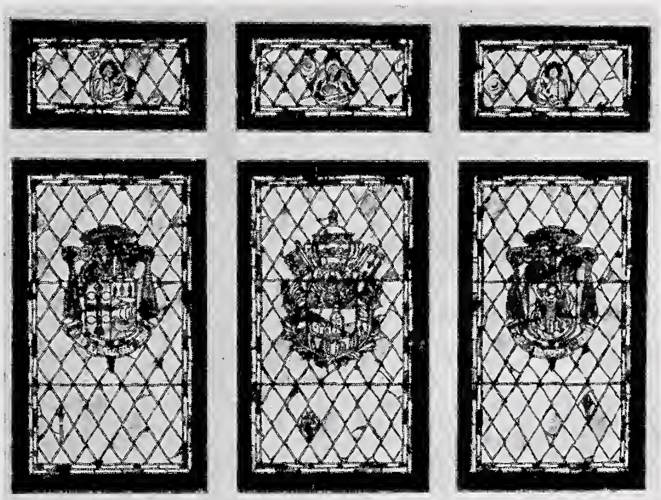
Sketch Model of a house in Bloomfield Hills, Michigan
Albert Kahn, Architect
The modeling of minor detail was omitted, such as rafter ends, flower boxes, shutters, Spanish tile on roof, etc.

# STAINED GLASS—III (Concluded)
# DECORATIVE POSSIBILITIES

BY JOSEPH G. REYNOLDS, JR., Craftsman

### Principles Governing the Designing of the Ideal Window

LET us now consider some of the principles governing the designing of the ideal window. As stained glass is pre-eminently the greatest medium for the expression of beauty in terms of translucent color, therefore color is of primary importance. It is an obvious fact that a window may be masterly in drawing and painting and yet hopelessly bad if the color combinations are inharmonious. "A stained glass window is decorated light. It should therefore be, and is in all the best examples, a design of colored light." This "design of colored light" implies a most careful arrangement of color spots. The aim should not be to get harsh glaring contrasts of color and value throughout the window. Such a scheme produces restlessness and is very trying to the eyes. Each separate color should be chosen not for its individual brilliancy but for its relation to the pieces that surround it. Merely selecting so many pieces of a brilliant greenish blue and so many pieces of a bright purplish blue and mixing them haphazard throughout a robe or background is not likely to produce rich harmony.



Heraldic Window

Library of Rt. Rev. Thomas M. O'Leary, (R. C.), Bishop of the Diocese of Springfield, Mass. Jno. Wm. Donohue, Architect

Heraldic devices in pure color are here placed on diamond quarries of varying tints and textures, designed to admit a flood of light, but to exclude the vision of objects outside

A stained glass window, being a part of the wall surface, should be made to look at, not to look through. In a residence, it may be desirable to look through as well as to look at the glass, but in a church, never. Therefore if this principle is adhered to, a pictorial landscape window ought never to be made. For such a design implies an attempt to create the illusion of looking through the window opening at a distant landscape. And carrying this principle still further, the pictorial rendering of actual objects should never be attempted. This eliminates all use of color or shadows or modelling in order to make details look natural. For it should always be remembered that a window is a "design of colored light." And if in designing "Christ's Entry into Jerusalem," considerations of color proportion and balance demand that the donkey be made bright blue, it should be done. To be influenced by pictorial considerations would mean ruining the design.

One of the problems confronting the craftsman in glass is the insistence on the part of the general public that the heads of the figures must be drawn very carefully and made very beautiful. There is no quarrel with the idea that the heads should be beautiful—so should the drapery, and all the details of ornament, and the combinations of color, be beautiful. The difficulty is in the ideal of beauty that the average person holds.

Many people who have seen and enjoyed mediæval glass think that it is barbarous and clumsy in drawing. They seem to feel that if the heads and faces were drawn as Raphael and Titian would have drawn them that they would be vastly improved. But such is not the case. "Indeed, the earlier artist with his simple methods of drawing does more in the way of expression than the later with all his superior delicacies; just as Massaccio designs a Madonna who is the Queen of Heaven, where Raphael paints a pretty peasant girl. And this difference is not only in the capacities of the artists; it is also in the methods they employ." Practically every modern restoration of an old window proves this. Oftentimes in replacing a broken head the drawing is "corrected" in accordance with pictorial ideas of good drawing, and the resulting effect is invariably weak and commonplace. A face or hand, like any other part of the window should take its place as an integral part of the design and attract no more attention than any other detail.

Many writers agree in condemning the Byzantine style as belonging to a period of art in which there was an almost complete lack of spontaneity and progress—when traditional forms and symbols were mechanically repeated. Be that as it may, these very shortcomings, if they be shortcomings, can, and should be made use of by modern workers in stained glass. The reasons for their use are as follows:

Stairway Window
Office of Allen & Collens, Architects,
Boston, Mass.

The emphasis on line and the silhouette; the isolation of figures against the background; the stiff angular forms of drapery; the conventional, inexpressive types of faces rather than individual portraits of real people with faces defining emotion; the simple color schemes with the color disposed in flat masses and these masses broken up by ornamental detail; the absolute lack of perspective, both linear and aerial, so that all the elements of the design are in one plane,—all these mannerisms of form peculiar to Byzantine art are especially adaptable to stained glass, and when these principles are applied by a master of the craft, not mechanically but purposefully, the greatest possibilities for beauty inherent in the material are developed. For it must always be remembered that glass is a medium that is markedly limited in its range of expressive power.

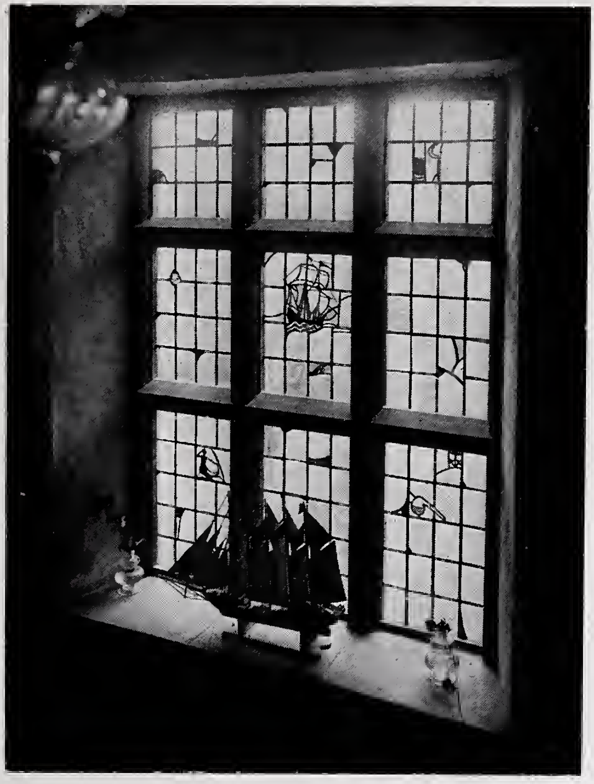
Again, the idea of symbolical as opposed to pictorial representation is a most important one. For, as has been pointed out, while "pictures" in glass cannot be successful decorations, symbolical representation is the noblest means of expressing ideas in decorative art. We are accustomed to think of symbolism as a method of expressing ideas that are decidedly antique. But as Dr. Richard C. Cabot has pointed out in a series of newspaper articles entitled, "What Men Live By," symbolism plays a very important part in our lives today. To quote him: "Most of us hear of symbols in algebra or religion, but have no idea of meeting them in play. Yet to my mind play without symbolism is like music without notes, or verse without words. A symbol is a representative, standing for something greater than itself. The golden balls stand for the pawnbroker, the striped suit for the convict, the cross for Christianity. Increasingly, civilization rests on symbolism, as commerce rests on credit. Yet to the uninformed, all symbols are meaningless. * * * The great value of symbols is that they enable us to handle or to express what would otherwise be too great for us. * * * Symbols are precious because they convey a wealth of meaning in compact form. Despite their convenience they are quite arbitrary and ridiculous to those who do not grasp them. * * * Respect for vital but intangible meaning behind a reasonable law, which baffles or defeats our will, is a training in the use of great symbols and so in the exercise of spiritual muscles. * * * Our moments of success or of defeat are not merely what they seem on the face of them. They stand as symbolic representatives of what the law and the invisible powers of the world have put up to us. They are interpreted like words or coins, by remembering what stands behind them, out of sight."

If then, symbolism is still a vital force in our lives, let us today make use of it and develop its great resources.

## Decorative Possibilities of Stained and Leaded Glass

Though it is true that stained and leaded glass has always been employed to a greater or less extent as an important element of decoration in cathedrals, churches, and the various edifices associated with religious work, nevertheless the splendid possibilities for the decorative use of this material in secular buildings have only begun to be realized in this country.

It is but comparatively seldom that the craftsman in stained glass gets an opportunity to design a window for a state or city institution, such as a public library or an art museum or a capitol, and when this does happen his work is generally confined to a skylight or to small openings in a dome. And then, oftener than not, he is instructed to use only tints of white glass with perhaps a little soft green or gold. But if planned for in the beginning, what splendid jeweled effects might be attained! Geometrical ornament, for instance, can be made exceedingly beautiful and full of interest. Schemes that are appropriate for mosaics and mural decorations are, in a general way, appro-



Stairway Window
Residence at Warren, Rhode Island
Harold Buckley Willis, Architect

priate for stained glass, and they can be made, if properly handled, far more effective in color—especially if the work is to be seen at a distance.

In times past, no doubt the architect has hesitated (and perhaps with good reason) to entrust the beauty of the interior of his public buildings to the hands of the glass worker. For while it is true that stained glass may be infinitely beautiful, it may also be indescribably ugly. A piece of wrought iron work, or even a panel of mural painting may be poorly executed or bad in color, but in the very nature of things they are bound to be less conspicuous than a stained glass window illuminated by the strong clear rays of daylight. But with the revival of interest in the craft many sincere workers are proving their ability to solve successfully whatever problems are presented to them, and consequently faith in their abilities is increasing.

The hospital is one type of public and semi-public building in which stained glass has been used but rarely. And yet there are very important reasons why it should be used always. How many people have lain in bed in a hospital, unable to sleep, and have been forced to gaze hour after hour at the bare gray wall before their eyes? One such patient testified that her eyes sought for some relief from the absolute blankness of the opposite wall and persisted in tracing the outlines of the cracks in the painted plaster. Her disordered imagination, induced no doubt by fever, turned these cracks into hideous, grinning faces and unspeakably revolting things. She endured this kind of torture until a friend, realizing the situation, brought to her room a richly colored stained glass medallion and hung it in the window. The beneficial effects were immediate. The patient at once expressed her joy in seeing beautiful color, and during the remainder of her illness she never tired of gazing at it. The explanation is simple. Beautiful color, like beautiful music, has a tonic effect; it lifts one out of the physical into the spiritual world.

Many hospitals now have leaded glass set in steel casements. Surely it would not add noticeably to the cost of the building to glaze a colored medallion into the leaded glass in each of the windows in the private rooms and the public wards. And the expenditure would be well worth while.

However, examples of our craft are being used more and more frequently in railroad stations and steamship offices, in club houses, in the better class of private residences, and also in apartment houses, cottages, and even in shop fronts. There are endless possibilities for the decorative use of leaded work in the form of geometric glazing, colored medallions or cartouches—perhaps heraldic in form—and in the use of white or clear glass of contrasting textures which may be used simply to produce an interesting surface in a window that is intended to be seen through, or to secure an attractive translucence in the place of the unpleasant vista that would meet the eye if that particular window were made of clear glass.

## Conclusion

Churches everywhere throughout this broad land of ours all have windows. And when the tourist, be he of the laity or of the cloth, visits the great French cathedrals and there sees for himself the glorious masterpieces of mediæval glass, he cannot help comparing them with the tawdry creations that fill many of the religious edifices at home.

Must we then, make slavish copies of mediæval windows for our churches? Assuredly no. If we make dull and lifeless imitations of a bygone day, a sudden artistic death will be our just reward. As some one has said, "The artist must go with the spirit of his own time or be strong enough to lead it." But should we quarrel with a man because we think his work too closely resembles that of the thirteenth century or the fourteenth or the fifteenth? Not necessarily. Is his work beautiful; does it charm; is it convincing; is it an honest expression of the things he cares most for in glass; does it fulfill its purpose of beautifully decorating the space for which it was designed? These are pertinent questions. Let his work be praised or condemned according to these standards. An architect is not condemned because his building resembles the Classic Greek, or the thirteenth century Gothic, or the English Tudor. No more, then, should the craftsman in glass be condemned for gaining his inspiration or even his motif from the genius of another day.

And so, if after study and contemplation of the great achievements of the past we build our work upon the same fundamental principles and create combinations that are new, beauties that are real, we then know we have been true to ourselves and that we have done something worth while. And those of us who have seen the vision of the marvelous and infinite possibilities for beauty that lie in living, glowing color, will continue to go back to the great periods for inspiration.

True it is that we are not living in the middle ages. We are living in the twentieth century; and whether we will or no, our work is an expression of the times in which we live. We cannot be thirteenth century men if we would. Let us, therefore, express ourselves freely and honestly by doing the things that we believe in and feel most worth while, pausing to look back perhaps for inspiration, but then pressing forward toward that great ideal which beckons us ever onward.

Let us, then, all co-operate to the end that stained glass may be worthy not only of the great traditions of the past, but that by expressing the highest ideals it may again achieve its rightful place as one of the noblest of the arts.

(The End)

House at
Hampton Lucy,
England

From the
Photograph
by Robert M. Blackall

# DEPARTMENT OF SPECIFICATIONS

THE last discussion in this department completed the series on specifications for concrete. The outline given herein will be found to be more complete in some respects than has been the discussion on the text of the specifications. It is believed that merely by inserting suggestive references in the outline the reader will be able to understand the reasons for the mentioning of such items and will be able to deduce reasons for further investigation with respect to any operation or to amplify the references as his judgment dictates. It will be found that certain references in this outline are repeated from references given in the outline for foundations. This repetition will be found in succeeding outlines and is done only for the sake of making the outline as complete as possible.

The reader will undoubtedly find it convenient to expand this outline to his own peculiar needs. It is realized that it is well nigh impossible to arrange an outline to meet the universal use and at the same time be capable of governing the construction of a specification for major operations as well as minor operations.

It may be well to direct the attention of the reader once more to the discussion given some time ago respecting the compilation of a master outline and checking list. The preparation of such helps will be an illuminating procedure for many of those who have been accustomed to write specifications on the basis of old specifications with the hope—often in vain—that everything has been taken care of as it should be.

### SPECIFICATION OUTLINE FOR CONCRETE WORK

I. GENERAL CONDITIONS
  a. A paragraph referring the reader to the General Conditions that will be made a part of the contract and which should be read by all bidders. This should be a standard clause.

II. SCOPE OF CONTRACT
  a. Extent of the work, given in brief outline, to be followed by
  b. A schedule of general items that are to be included in the work. This schedule should be roughly drafted from the general outline or master specification and should be completed only when the specifications are finished, when the paragraph or sub-division captions may be used. This schedule, in tabulated form, will improve the clarity and business-like appearance of the document.
  c. Work of a similar character that already has been done by other contractors. This to be in tabulated form.
  d. Work of a similar character that will be done by other contractors concurrently with or subsequent to this contractor's work. This to be in tabulated form.

III. EXAMINATION OF SITE
  a. Caution bidders of the necessity for making visual examination of physical conditions of the site and the work that already has been done by other contractors, so the expenses easily foreseen may be anticipated and included. Do not assume that work or difficulties that cannot be anticipated by the architect should be foreseen and included by the contractor.

IV. DRAWINGS
  a. Schedule the drawings that will be made the basis of the contract, giving the number of each sheet and its title.
  b. A statement that further drawings, explanatory of those scheduled in the preceding paragraph, will be available at later dates.

  Note: It is probable that the General Conditions used will have clauses covering the drawings, but the information suggested above will prove invaluable to everyone interested in the specifications. For instance, the bidder will know whether or not he has been furnished all of the drawings he should have.

V. QUALITY OF MATERIALS
  a. Each material that the contractor will be required to furnish should be listed here and the standards of excellence that will determine their acceptance or rejection should be specified. This grouping is suggested here so that all readers of the specification will know where to turn to when looking for materials and their required qualities. All physical characteristics that will be considered should be mentioned, such as grade, weights, gauges, etc.
  b. Give a general clause stating the general excellence that is required, keeping in mind available local materials or those "foreign" materials that would, most likely, be used. This must be in correlation with any clause of a similar nature that is in the General Conditions. Since it is a debatable question whether or not the customary clause that "materials shall be of the best of their kind" is suitable for all occasions, the specification writer

should not be afraid to specify second grade material where its use is not of a detrimental character and is more efficient, economically, than another and better grade.

c. List all materials entering into the required work, somewhat as follows:
   1. Cement
      - A. S. T. M. standards
   2. Sand
      - Or other fine aggregate graded by sieve size
   3. General
      - Graded by sieve sizes
   4. Crushed Stone
      - Graded by sieve sizes
   5. Slag
      - Graded by sieve sizes
   6. Other coarse aggregate
   7. Water
   8. Lime
      - Hydrated
      - Quick
   9. Integral waterproofing compounds
   10. Surface applied or membrane waterproofing compounds
   11. Forms and centering
       - Wood
       - Metal
   12. Reinforcing steel
       - A. S. T. M. standards
   13. Accessories for reinforcing steel
       - Tie wires
       - Chairs
       - Spacers
   14. Concrete inserts
   15. Wrappings for fireproofing of structural steel work
       - Plain wire
       - Metal lath
       - Patented types
   16. Hanging wires
       - For suspended ceilings or other hung work
   17. Special bonding agent for work planes, etc.
   18. Paint for structural steel
       - Graphite
       - Basic Chromate of Lead or Zinc
       - Sublimed blue lead
       - Other kinds available
   19. Sidewalk vault lights
   20. Other items

### VI. Samples of Materials

a. If samples of any materials are to be submitted for approval before delivery, state so, in order to avoid later unpleasant experiences.

### VII. Inspection of Materials

a. If certain materials are to be inspected by testing engineers, state so, laying down all conditions that the contractor will be required to meet.

b. It is suggested that testing engineers be employed and paid by the Owner direct.

c. If the specifications for concrete construction are to be based on the Joint Committee report or on the specifications of The American Specification Institute the matter of inspection of materials will, of course, be gone into more thoroughly.

### VIII. Delivery and Storage of Materials

a. If materials are to be delivered over switch track close to or on site, state so. If it is believed that all materials will be delivered by truck it may not be necessary to use this paragraph unless conditions out of the ordinary are present.

### IX. Contractor's Design Drawings

a. If the specifications require the furnishing of fabricated items or other work for which the contractor is to prepare design drawings for the approval of the architect or his engineer (either consulting or testing) the governing conditions should be stated.

b. Shop or fabrication drawings based on the contractor's design drawings should, of course, be submitted for approval where the controlling design drawings must meet approval.

### X. Construction Plant

a. It is a debatable question whether the specifications should attempt a very great control over the construction plant although, for some operations comprising extraordinary phases, there may be occasions demanding some specification control.

b. Erection machinery should be so disposed that little interference will be given the work of contractors not concerned with the use of these particular appliances.

c. Erection machinery that is to be placed on structural concrete structures should not be located without the approval of the designer of the structural framework, else damage may be done to the structure.

### XI. Hoisting of Materials

a. The matter of hoisting of materials often causes a bit of grief on the work, through loose construction of the specifications.

*(Continued on page 16)*

# DEPARTMENT OF ARCHITECTURAL ENGINEERING

## TRUE NET SECTIONS OF RIVETED TENSION MEMBERS*

BY C. R. YOUNG

Associate Professor of Structural Engineering, University of Toronto

COMPARISON of the net areas of square and zigzag sections across a riveted tension member and the selection of the least, does not form the correct basis for arriving at the capacity of the member. Nevertheless, this method is commonly followed. In a number of structural handbooks there are tables for ready use giving the stagger required to maintain net section, and the rule for their application is that if the stagger is ever so little less than this critical one, the entire area of the second hole must be deducted. Thus referring to Fig. 1 (a), if $s$ is less than $(2gh + h^2)^{\frac{1}{2}}$, two full holes must be deducted, whereas if $s$ is greater than $(2gh + h^2)^{\frac{1}{2}}$, only one hole is to be deducted. Similarly, for the case shown in Fig. 1 (*b*), three full holes are to be deducted if $s$ is less than $(2gh + h^2)^{\frac{1}{2}}$.

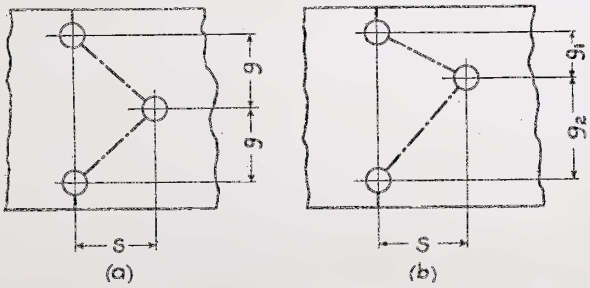


Fig. 1. Stagger ratio to maintain net section

Apart from the illogical procedure involved in deducting a full hole when the stagger is but slightly under the critical one for maintaining equal sections, the existence of a component of shearing stress on each diagonal section renders the familiar handbook method incorrect. This shearing stress, when combined with the normal stress on the section, produces a resultant stress greater than that on a right section of the same area.

Several writers have already pointed out the theoretically correct method of computing deductions and its agreement with actual experiment. Victor H. Cochrane, in *Engineering News* of April 23, 1908, indicated the method; T. A. Smith, in *Engineering News* of May 6, 1915, submitted a diagram based on true maximum stresses, from which the number of holes to be deducted for 7/8-in. rivets could be determined; and D. B. Steinman, in *Engineering News-Record* of June 14, 1917, proposed two alternative approximate rules for calculating the correct deduction. The formula for determining the theoretically correct deduction may be conveniently established in the following manner.

Let a flat tension member of breadth $b$ and thickness of one unit be subjected to a tensile stress, which for a right net section AF or GK through any rivet hole (Fig. 2), has an *average* value of $f$ lb. per sq. in. Let the gauge lines be $g$ in. apart, the rivet stagger be $s$ in., and the diameter of holes for deduction purposes be $h$ (diameter of rivet plus 1/8 in.).

The apparent total stress on the strip CE is then $fg$, but since the resistance on the portion DE may be lowered by the proximity of rivet 2, the average intensity of stress on CE must be

$$f \times \frac{g}{g - xh}$$

where $x$ is some fraction of one hole. For equalized strength on a right section passing through hole No. 1 and on a zigzag section such as A12K, the value of $x$ should be such that the normal stress on CE should not be exceeded by the maximum diagonal stress on the inclined section C′H′.

The intensity of stress on C′H′ parallel to the axis of the member, must be such that this area will resist the total stress on the strip CE, that is $fg$ lb. It, therefore, equals

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* *Reprint of Section, No. 5, Bulletin No. 2, 1921, School of Engineering Research, University of Toronto, Toronto, Canada.*

$$f' = \frac{fg}{\sqrt{g^2+s^2} - h}$$

The normal stress on C′H′ is then

$$f_n = f' \times \frac{g}{\sqrt{g^2+s^2}}$$
$$= \frac{fg^2}{g^2+s^2-h\sqrt{g^2+s^2}}$$

The tangential stress on C′H′ is

$$f_t = f_n \times \frac{s}{g} = \frac{fgs}{g^2+s^2-h\sqrt{g^2+s^2}}$$

But in accordance with the well known principle of compound stress the maximum stress on the section C′H′ is

$$f_m = \frac{1}{2}(f_n + \sqrt{f_n^2+4f_t^2})$$
$$= \frac{f_n}{2}(1+\sqrt{1+4\frac{s^2}{g^2}})$$

Introducing the value of $f_n$ found above,

$$f_m = \frac{fg(g+\sqrt{g^2+4s^2})}{2(g^2+s^2-h\sqrt{g^2+s^2})}$$

But this maximum intensity of stress on C′H′ should, if the proper rivet hole deduction has been made, be equal to the intensity on the right section CE, that is

$$f_m = f \times \frac{g}{g-xh}$$

Solving for $x$, we obtain

$$x = \frac{g}{h} \cdot \frac{2(g^2+s^2-h\sqrt{g^2+s^2}}{h(g+\sqrt{g^2+4s^2})} \quad \ldots\ldots(1)$$

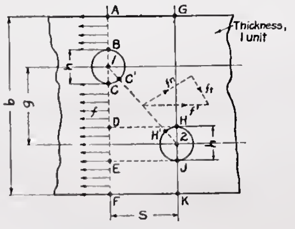


Fig. 2. Relation of Stresses on Right and Inclined Sections

If more than two gauge lines are used, the deduction for a rivet on the third gauge line would be calculated in the same manner. The total number of rivet holes to be deducted from the gross right sectional area of a tension member to give true effective section is, therefore,

$$n = 1 + x_1 + x_2 + x_3 + \quad \ldots\ldots\ldots\ldots\ldots(2)$$

The terms $x_1$, $x_2$, etc., represent the fractions of successive holes that are to be deducted in addition to the whole of the first hole on the section considered. Their values are found from Eq. (1) by the insertion of the appropriate values of $g$ and $s$.

Formula (2) is to be applied to alternative sections, the successive terms representing the deductions for successive holes considered in a chain across the member. The particular group of rivets to be considered is that which will give the greatest total deduction, whether the rivets lie on adjacent gauge lines or not.

The theory considered above is fortunately well supported by experimental research. Tests made on riveted tension splices by the Deutscher Eisenbauverband, and reported in 1915, showed that the strength of net sections was in entire accord with the indications of this theory.

### APPROXIMATE RULES

The labor involved in applying formula (1) to alternative sections would preclude its use in the form given on all except the most important work. Fortunately, it is possible to devise approximate rules based on the correct theory which will give results sufficiently accurate for most purposes.

Early efforts to frame specifications so as to take account of the observed tendency of joints to fail along zigzag lines unless a certain excess of material were provided along such sections resulted in rules such as the following:

"Deduct from the gross transverse section all holes either in a transverse line or in a diagonal line when the net section of the latter does not exceed the former by more than 30%." (Greiner's *General Specification for Bridges,* 1911).

"All rows of rivet holes shall be deducted unless so staggered that the net section along a zigzag line, taking all distances in a diagonal direction at only three-fourths of their value, exceeds the corresponding net section taken square across the shape or plate." (Quoted by D. B. Steinman.)

Such rules are unsatisfactory in character. In the first the percentage increase is required on all portions of the zigzag section, regardless of their inclination to the axis of the member. Obviously this procedure is 30% in error for right sections and only a little less so for those that are nearly normal to the axis. The rule, as a whole, is consequently too severe. The deduction of 25% from the diagonal distances provided in the second rule is also excessive, since application of the correct theory, now amply supported by experimental investigation, shows that for the critical diagonal section which makes an angle of 55° with a right section, the effect of shear is to increase the stress by only about 16%.

A popular form of specification recognizing, although inadequately, the weakness of diagonal sections is one such as the following:

"The greatest number of rivet holes which can be cut by a transverse plane, or come closer than 2 in. of it, are to be deducted from the gross area of the section."

Whether the exact distance specified be 2 in. or some similar dimension, the rule is dangerous in that it takes no account of the effect of gauge, or distance between rivet lines. While it is safe and proper to neglect entirely a second ¾-in. hole staggered 2 in. with respect to a first when the gauge is 1½ in., it is not correct to neglect the second hole when the gauge is over that amount. When it is 3 in., 0.56 of the second hole should be deducted, and when it is 6 in., the portion is 0.87. If the holes be 1 in. diameter, a stagger of 2 in. with a gauge of 2 in. would require the deduction of 0.40 of the second hole, while with a gauge of 6 in. the deduction would be 0.90 hole. To give, therefore, a rule which is independent of gauge is to lead to serious error, particularly where the gauges are large.

### GRAPHICAL COMPARISON OF RULES

In order to establish a rational basis for an approximate rule for net sections there have been plotted in Fig. 3 curves giving the correct deductions required in certain critical and in certain typical cases. The most serious spacing of rivets, so far as deductions are concerned, is that pitch which will cause the rivets to be the minimum allowable distance apart, say 3 diameters, center to center. Accordingly, there have been plotted in Fig. 3 curves giving the correct deductions for ⅝-in. and ⅞-in. rivets for minimum diagonal pitches giving stagger ratios varying from 0 to 1.60 and from 0 to 1.57 respectively. The gauges vary from 1.88 in. to 1.0 in. and from 2.63 in. to 1.4 in. respectively. The curves thus represent the correct deductions for the full range of applicable stagger ratios with the diagonal spacing always at the permissible minimum. Curves have also been plotted, giving the correct deductions for ⅝-in. rivets for the appropriate range of stagger ratios with gauges of 3 and 6 in. Corresponding curves for ⅞-in. rivets with gauges of 3 and 6 in. are also shown.

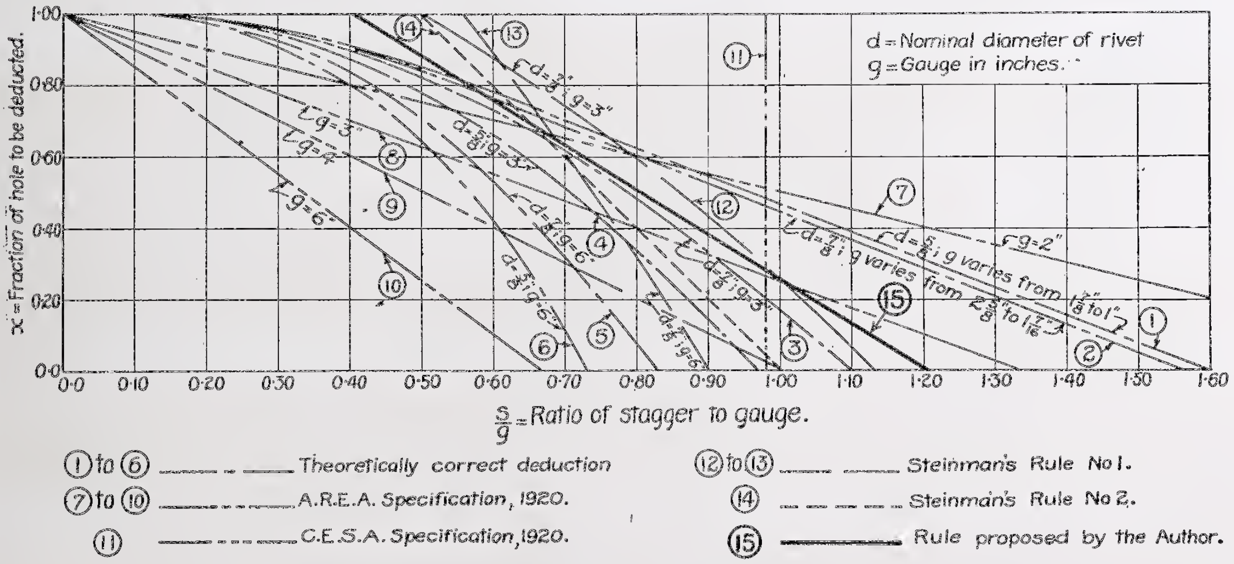


Fig. 3. Comparison of Approximate Deduction Rules

From an examination of these curves it is evident that

(1) For a given stagger ratio and a given gauge the fraction of a hole to be deducted is greater for large than for small rivets.

(2) For a given size of rivets and stagger ratio, the fractional deduction is greater for small gauges than for large ones.

With Fig. 3 as a basis it will be useful to examine some of the approximate deduction rules that have been proposed in order to ascertain whether they are sufficiently accurate to be satisfactory.

Some recognition of the influence of the stagger ratio on net area is contained in the deduction rule adopted in the 1920 specification of the American Railway Engineering Association. This rule is as follows:

"The net section of riveted members shall be the least area which can be obtained by deducting from the gross sectional area the areas of holes cut by any perpendicular to the axis of the member and parts of the areas of other holes on one side of the plane within a distance of 4 inches, which are on gauge lines one inch or more from those of the holes cut by the plane, the parts being determined by the formula:

$$A = \left(1 - \frac{p}{4}\right)$$

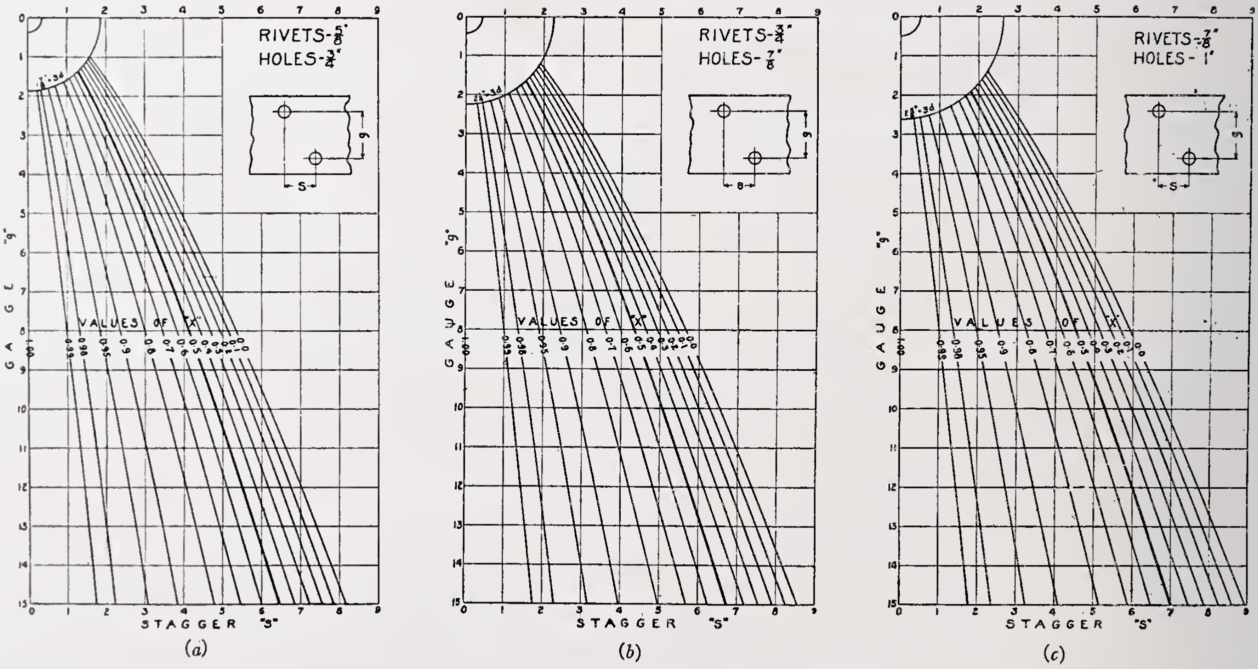
where $A$ = area of one hole,

$p$ = distance in inches of the center of the hole from the plane."

In Fig. 3 there have been plotted for various stagger ratios the deductions required under this rule for gauges of 2, 3, 4, and 6 in. Comparing the lines so drawn with the curves for correct deductions it is seen that for all gauges with moderate stagger ratios the deductions are too small. For the smaller gauges and larger stagger ratios the deductions may be too large. It should be noted that the number of holes to be deducted is independent of the size of the rivet.

An approximate rule established in the specifications for steel railway bridges of the Canadian Engineering Standards Association is as follows:

"There shall be deducted from each member as many rivet holes as there are gauge lines, unless the distance center to center of rivets measured in the diagonal direction is at least 40% greater than the distance between the gauge lines."



(a) (b) (c)

Fig. 4. Theoretically Correct Deductions of rivet holes for various Gauges and Staggers

This rule, which requires the deduction of a full rivet hole in every case, where the stagger with respect to the last rivet would give a diagonal distance less than 140% of the gauge, is needlessly severe. It means, as will be seen from Fig. 3, that whenever the ratio of stagger to gauge is less than 0.98 a full second hole must be deducted, and when this ratio is greater than 0.98 no part of a second hold need be taken away.

A rule proposed by D. B. Steinman in *Engineering News-Record* for June 14, 1917, also based on calculating the section along diagonal lines is as follows:

"The net section of a plate or shape shall be defined as the least section obtainable across the rivet holes, square or zigzag, taking every net distance in a diagonal direction at 85% of its value, except where 85% of the distance is less than the square projection, in which case the latter shall be used instead."

This rule, which will be referred to as Steinman's rule No. 1, may be plotted with respect to various stagger ratios so as to give necessary deductions from the right section. Such has been done for $\frac{7}{8}$-in. rivets and gauges of 3 and 6 in. in Fig. 3. It is thus seen that the rule gives a close approximation to the deductions where the gauge is small, but deductions that are too wide of the mark for the larger gauges. It is rather more difficult to apply than rules which depend wholly on the relation of stagger to gauge, by reason of the necessity for calculating the net section along diagonal lines.

Dr. Steinman proposed a second, and more readily applied, although a more approximate, rule which was stated as follows:

"After deducting the first hole, each successive hole is to be deducted if its stagger *s*, with respect to the proceeding hole, does not exceed one-half the gauge *g*, and no deduction is to be made if the stagger equals or exceeds the gauge. For intermediate values of the stagger ratio, a fraction of the hole is to be deducted as may be obtained by interpolation, that is, deduct $2(g - s)/g$."

Comparing the graph of this rule, Fig. 3, with the curves giving theoretically correct deductions, it is seen that for close spacing of rivets it gives deductions that are too great for the smaller values of the stagger ratio and deductions that are too small for large values of this ratio. It gives deductions that are too great for the larger gauges with all applicable values of the stagger ratio. The results given by it, however, represent a fair average between those obtained for the usual range of gauges by rule No. 1. For a simple, easily applied working rule, to be applied in cases where great accuracy is not required, Steinman's rule No. 2 is very satisfactory. It is, for such cases, much better than any of the others mentioned.

Since any single deduction rule intended for general use with various sizes of rivets and gauges should be based rather more on the worst conditions than on the average ones, it is believed that such a rule should conform more closely to the conditions existing with large rivets and small gauges than does Steinman's rule No. 2. With this in view the writer would propose the following rule:

"The fraction of the area of a rivet hole that must be deducted for the second of any two longitudinal rivet lines shall be calculated by the formula:

$$x = 1.50 - 1.25\,\frac{s}{g}$$

where $x$ = fraction of the rivet hole in question to be deducted,

$s$ = stagger of rivet with respect to rivet on last gauge line,

$g$ = distance between gauge lines.

The deduction for any one rivet is in no case to exceed unity."

This formula, when plotted in Fig. 3, shows close conformity to the conditions likely to obtain in riveted work with close spacings. The curve lies reasonably near those for small gauges for the higher stagger ratios and approaches them for the lower stagger ratios more closely than the curves for the other approximate rules.

### Deductions by Diagram

To obviate the large amount of work required in solving formula (1), the diagrams of Fig. 4 have been prepared. These give the theoretically correct deductions for any usual ratio of stagger to gauge. The curves have been drawn for $\frac{5}{8}$, $\frac{3}{4}$ and $\frac{7}{8}$-in. rivets, for staggers up to 9 in. and for gauges up to 15 in.

The use of the diagrams is simple. Thus, suppose it is desired to find the required deduction for a $\frac{3}{4}$-in. rivet on a second gauge line 9 in. from the first gauge line and having a stagger of 5 in. with respect to the preceding rivet. From Fig. 4(b) it is seen that the deduction for the second rivet should be 0.4 hole. Adding this to the first hole the total deduction would be 1.40 holes.

The saving in time effected through the use of diagrams for true effective section will be evident from a study of Fig. 5. The weakest section in this case can be precisely determined only by comparing the deductions on sections A B C D, A B F C D, A B F C I J, A B F G, A B F I J, E F C D, E F G and E F I J. Of course it is usually possible to eliminate some of the zigzag sections by inspection. In the present case, for example, it is evident that the deduction along sections A B F G, E F G and E F I J are less than along A B C D. These sections, therefore, need not be considered in making the comparison.

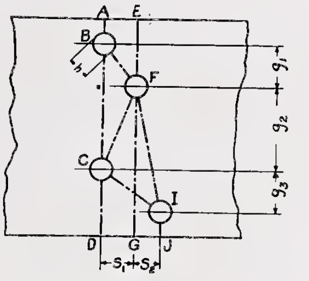


Fig. 5. Comparison of Alternative Sections

To take a numerical case assume the following values for the indicated dimensions of Fig. 5:

$g_1 = 2\frac{1}{2}$ in. $\qquad s_1 = 2$ in.
$g_2 = 5$ in. $\qquad s_2 = 1\frac{1}{2}$ in.
$g_3 = 2\frac{1}{2}$ in. $\qquad h = 1(\frac{7}{8} + \frac{1}{8})$ in.

By making use of Fig. 4(c) the deductions that apply to such sections as cannot be eliminated by inspection can readily be set down. It is found that the total deductions in the various cases are then as follows:

A B C D = 1 + 1 = 2.00 holes
A B F C D = 1 + 0.55 + 0.85 = 2.40 "
A B F C I J = 1 + 0.55 + 0.85 + 0 = 2.40 "
A B F I J = 1 + 0.55 + 0.96 = 2.51 "
E F C D = 1 + 0.85 = 1.85 "
E F I J = 1 + 0.96 = 1.96 "

Thus the most dangerous section is found to be A B F I J, for which 2.51 holes should be deducted.

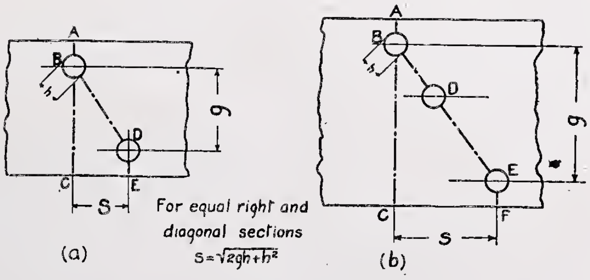


Fig. 6. Stagger to give Total Deduction of Two Holes

It is to be remembered that the formula on which these diagrams is based is so fashioned that the deduction is to be made from the gross right section of the member. If an 8 by $\frac{1}{2}$-in. plate contained two 1-in. holes on a 5-in. gauge and 2-in. stagger the net effective area to be considered in design would be $(8 \times \frac{1}{2}) - (1.85 \times 0.5) = 3.08$ sq. in.

In design it is often desirable to determine the necessary stagger in order that the true deduction may be exactly one hole, or two holes. Thus, for the case shown in the upper right hand corner of Fig. 4(b), assuming $\frac{3}{4}$-in. rivets, the stagger required to make $n$, the number of holes to be deducted, $= 1$ is found by noting on Fig. 4(b) the horizontal scale reading of the point where the proper gauge line intersects the curve $x = 0$. For the case shown in Fig. 6(a) the value of $s$ required to make $n = 2$ is found, if the rivet be $\frac{3}{4}$-in., as before, by reading from Fig. 4(b) the stagger corresponding to the point where the gauge line intersects the curve $x = 0.5$. Where the situation is as illustrated in Fig. 6(b) the stagger necessary to make the total deduction equal to exactly two holes, is found by noting on the horizontal scale the reading for the point where a vertical intercept between the gauge lines representing $g_1$ and $g_2$ is bisected by the curve $x = 0.50$.

In order to apply the methods described, to the calculation of net sections in angles or channels, it is only necessary to consider the angle or channel developed. If, for example, there is one line of rivets in each leg, of an angle, both the gauges are $g_1$ and the thickness of the angles is $t$, then the angle would be equivalent to the plate shown in the upper right hand corner of Fig. 4 (a), $g$ being equal to $2g_1 - t$.

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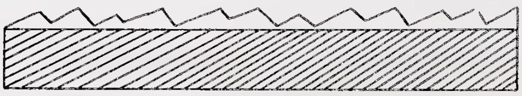
# BUILDING A PAINT FILM

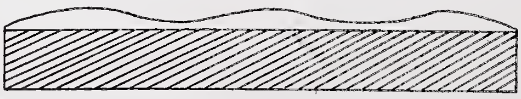
## Some suggestions on the preparation of factory made paints and the application of paint to surfaces

THE average paint film is less than 1/300 of an inch thick, and of necessity it must be of such character as to withstand the action of the elements, varying from the hottest summer sun to below-zero weather. Ample allowance must be made for contraction and expansion of both surface and film, and the paint must retain its fresh appearance as long as possible. Likewise it must be so made that it will wear down evenly over a period of years, in order that the surface may be in proper condition for repainting.

From close inspection and comparative tests of two characters of paint films, one made with a properly treated linseed oil and the other with an untreated oil, it is found that the place where the film breaks first is in the tiny crevices left by the brush bristles. As a chain is no stronger than its weakest link so the weakest point in a paint film is in the hollows left by brush marks, as shown on right.



(a). Cross-section of wood covered with an untreated linseed oil paint film



(b). Cross-section of a properly built paint film

Fig. 1. Comparison of paint films

The film at (b) Fig. 1, will not retain as much dirt and dust as the film at (a), and will therefore keep its fresh appearance longer. It affords better protection to wood and metal surfaces, for moisture cannot easily penetrate it. It also has much more gloss, which it retains well during its whole life.

The vehicle content of a properly built paint is pure linseed oil, with just enough high grade drier properly to dry the paint. As raw linseed oil dries very slowly a drier is necessary in the paint, or it may be used as "boiled oil" which dries more rapidly. Boiled oil is no longer boiled for the process is costly and darkens the oil greatly. So-called "boiled oil" is made today by heating a small quantity of oil with lead and manganese oxides to form a drier which is subsequently added to the raw oil.

A paint manufacturer says the pigment content should contain 90% lead and zinc and 10% inert material. Of the 90% lead and zinc, 55 parts are lead and 35 parts zinc, which as a whole is in the proportion of approximately 60 lead to 40 zinc. This is much the best proportion from the standpoint of hiding properties and service, as distinguished from mere covering.

The lead content is a mixture of pure Carbonate and pure Sublimed or Sulphate of Lead, both of which have intense hiding qualities, and produce a film far superior to that obtained through the use of but one lead content, no matter which it may be.

Of the 10% inert material used, one-half is Asbestine or Magnesium Silicate. This serves to keep the paint in suspension, for although it is very finely ground, under the microscope it has an elongated appearance, and like hair in plaster, it knits the pigments together. One-fourth consists of Calcium Carbonate, used primarily to offset any acidity in the linseed oil, and to keep the paint in proper condition in the package. One-fourth is pure water-floated Silex which lends "tooth" to the paint, helping the first coat to adhere to the surface, and the succeeding coats to each other. Silex also helps the spreading or surface covering qualities in the paint. While very finely ground, each particle of Silex is like a needle point and per-forms a definite function. These small quantities of varied inert material help paint as tungsten or vanadium helps steel.

Mr. G. B. Heckle mentioned several of the largest properties in the world which have adopted and adhere strictly to the use of paint made with more than one pigment for the protection of their property. For example, the New York Central, the Pennsylvania and the New York, New Haven and Hartford railroads are said to have long ago selected paint prepared with a combination of pigments as being superior to the single pigment variety.

Dr. C. B. Dudley, late Chemist of the Pennsylvania Railroad, stated his belief regarding lead and zinc as follows: "The value of either is enhanced by the addition of the other . . . and if to this combination is added a proportion of inert pigment . . . the paint will be not only further improved but will be more economical in its consumption of solid color to produce a given tint."

Mr. G. B. Heckle is further quoted as follows: "Paint manufacturers hold that the addition of zinc reduces the tendency of the lead to chalk, while the addition of lead to zinc prevents excessive hardening." Dr. Dudley amplified this when he stated that he had no reason to question this conclusion, but that in practice he and his associates always added a rather high percentage of inert pigment. He also stated that "where lead or zinc alone is used a percentage of inert pigment should also be ground with them."

A properly made paint film may be quite correctly likened to concrete—the different parts, properly compounded, make a perfect whole, and while the film is extremely thin, it may be truly said that it is scientifically "built."

## Distinguishing Characteristics of Mahogany

ONLY true mahogany from tropical America, "African mahogany," and "Philippine mahogany" are commonly sold as mahogany in this country, but at various times over 60 different species of timber have been sold under that name. Although all of these species resemble each other in varying degrees, tropical American mahogany and "African mahogany" possess one important characteristic in common. This is the occurrence of dark amber-colored gum in many of the pores. The gum does not fill the pores but is recognized as dark specks or streaks in the pores as seen on end or side grain. This gum is barely visible to the naked eye, but is easily seen through a hand lens with a magnification of 10-15 diameters. In preparing the end grain of the wood for examination, a very sharp knife should be used to make a smooth cut.

Some other woods have similar dark masses of gum in the pores, but none of these are commonly substituted for mahogany. Among them are crabwood and sapeli, species imported from South America in small quantities only, and the Cedrelas (Spanish cedar, etc.), which are rarely sold as mahoganies, and are easily recognized by their odor.

True mahogany has fine, continuous, concentric lines on the cross section usually from 1/8 to 1/2 inch apart, which distinguish it from "African mahogany" in which these lines never occur.

"Philippine mahogany," although not marked by the black masses of gum, is distinguished from true mahogany and other so-called mahoganies by the presence of fine, white, tangential lines 1/8 inch to several inches apart, readily visible to the naked eye, and showing under a lens as rows of small openings filled with a white substance.

A more complete key and description of mahogany and so-called mahogany, which describes common species in detail, may be obtained from the Forest Products Laboratory.

## Insulation Problems

A CAREFUL study of Heat Transmission, Corkboard and Air Spaces by Arthur J. Wood and E. F. Grundhofer is the subject of Bulletin No. 10, The Engineering Experiment Station, State College, Penn. In the case of a good insulation, as used for a cold storage room, internal conduction is the essential factor, while in the case of a poor insulator, as used in a boiler tube, good conduction is necessary and the surface transmission becomes all important. Between these extreme conditions, the relative importance of conduction and surface transmission varies with each case considered. The Bulletin gives in detail a number of tests and is a valuable contribution to the literature on the subject. It also contains a bibliography of 268 references to, and short abstracts of, articles on heat transmission.

## Safety Code for Conveyors and Conveying Machinery

THE introduction of mechanical conveyors in many industries has eliminated a large proportion of the accidents resulting from the manual handling of materials, but it has at the same time introduced new hazards. An important step toward the solution of these new accident problems has just been accomplished through the decision of the American Engineering Standards Committee that the development of a Safety Code for Conveyors and Conveying Machinery be undertaken.

All interested national organizations will be asked to co-operate in the formulation of the code, which will be intended as a guide for the safe operation and maintenance of conveyors and conveying machinery coming under the following main divisions: gravity, belt, chain, flight bucket, apron, screw and jigging conveyors, car hauls, aerial cableways, overhead trolley, and pneumatic tubes.

All shafting, pulleys, belts, link belts, chains, gears, sprockets, couplings, clutches, etc., used on and in connection with conveyors and conveying machinery will be covered in the Mechanical Power Transmission Code now in preparation.

### The Yellow Stain on Hardwood

A TROUBLESOME defect often found in hardwood lumber is that recognized as yellow stain. It is usually distinguished by a pale yellow color, occurs generally in streaks, and is detected most easily when the wood is surfaced, although at times it is present without any discoloration of the wood. Its first symptom may be a moldy appearance of the wood. Yellow stain has been observed by the Forest Products Laboratory, says *Technical Notes,* in hickory and maple tool handles, in birch veneer, and in oak airplane propellers and wheel spokes. It is classified in the *Pencillium divaricatum* group of fungi, and resembles one of the fungi which damage wood pulp.

The only damage that yellow stain is positively known to do is to mar the appearance of the finished product, since it usually penetrates the wood so deeply that it cannot be surfaced off. It is probable, however, that the fungus actually weakens the wood, and the use of yellow-stained lumber for airplane construction or similar purposes where strength is important is to be discouraged until more is known about the action of the fungus on wood structure.

Lumber can be protected from attack of the yellow-stain fungus by seasoning the stock without delay after it is cut, storing it in a dry place, or treating it with preservatives.

### The Ignition Temperature of Coal

IN connection with the storing of coal in piles the ignition temperature takes on a real significance. Coal is actually burning at all times and even at low temperatures. If the heat thus produced is sufficiently confined and air is supplied to the coal at the proper rate the temperature of the interior of the mass will rise. Bulletin No. 128 of the Engineering Experiment Station of the University of Illinois, "The Ignition Temperature of Coal" by R. W. Arms makes a study of this problem with the object of determining the influence of the temperature of ignition of the various coals upon the liability to fire while in storage.

### Chilled Car Wheels

OWING to the desirability of obtaining definite information concerning the magnitude and distribution of stresses in chilled car wheels and of determining the limits of these wheels as used today, and with a further view of improving the chilled iron wheel in order to meet future requirements, a co-operative investigation was entered into by the Association of Manufacturers of Chilled Car Wheels and the University of Illinois. Bulletin 129 of the Engineering Experiment Station of the University of Illinois presents the results of the first part of this investigation.

### The Architect and the Heating Problem

AT the June convention of the American Society of Heating and Ventilating Engineers, Mr. E. P. Bradley of St. Louis, Mo., in an interesting and informative address on "Mutual Responsibility of the Heating Engineer and the Architect," ended with the following criticism of past practice and recommendations for co-operation in the future.

Many of the buildings of today require the co-operation and co-ordination of the work of the heating and ventilating engineer with the architect. Many times little consideration is given to this feature of the building, and frequently too late. Boiler rooms are located in corners that cannot be used for any other purpose; if ventilation is a requirement, fan rooms are located in out-of-the-way nooks with no way to get fresh air to them or to conceal the duct system without ruining the basement; insufficient space is allowed for stacks, pipe shafts, and risers; radiators are located improperly resulting in inefficient service; fresh air inlets and vents to rooms are improperly located, resulting in drafts or poor circulation and ventilation, notwithstanding the fact that more than sufficient air may be removed to produce good results; little consideration or allowance is made for pumps, heaters and other accessories that enter into the heating and mechanical plant and they are usually remotely located from the section or apparatus with which they function.

Somehow it all works out and the plant operates, but the real problem only develops from that point on. The plant is inconvenient to operate, the cost being excessive, maintenance high, and performance disappointing. The net result is a handsome building, elegantly furnished and appointed, well thought out in plan and detail, conveniently arranged, but lacking in essential comfort.

Co-operation with and deference to the experience and training of the heating engineer would assure comfort with easy and economical operation; obtain for the architect and his client the best design, and the most economical use of the materials available, would insure the selection of material and equipment best adapted to the situation, and above all secure for the architect an efficient and sufficient system at an agreeable cost, and an installation worked out in harmony with the building design and detail.

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The American Architect and the Architectural Review *has gratuitously set apart this section for use by The American Specification Institute. The Editors and Publishers assume no responsibility for any statements made, or opinions expressed.*

*The purpose, simply stated, is to afford an organization which, it is believed, will become a most important element in architectural practice and building operations, a medium through which it may, without expense to itself, reach a class of readers that are most intimately identified with the field of the activities of The American Specification Institute.*

*Publishers,* The American Architect and
The Architectural Review.

SPECIFICATIONS for building construction work have been in the main the product of individual effort and as such have varied in many features that may be given a common denominator through the unified efforts of those who are intimately acquainted with the needs for improvement in the writing of specifications.

This does not mean necessarily that specifications should be standardized to such an extent that one would be exactly like all others. Such an attempt would, of course, be quite absurd and of practically no value through its stultifications of the individuality that is so necessary to a successful accomplishment of the desired results.

It is believed by the Board of Governors of The American Specification Institute that if the efforts of individual specification writers can be directed along lines that will lead to a more easy and more happy accomplishment of their work through the mutual study of specifications under the direction of the Specification Institute and the co-operation of all its members a very great deal of good will come from such efforts especially when participated in by all those eligible to membership.

Owing to a present lack of means for collecting and distributing information concerning specifications and the writing thereof, there is a needless duplication of study, research and labor on the part of specification writers. Since the organization of the Specification Institute a year ago last March it has been the continual endeavor of those in responsible charge to provide means for the assembling and distribution of information so that immediate results in the improvement of specification documents may be had.

Those specification writers who have had sufficient vision to analyze the problems they must meet and who have attempted to organize their work in some more or less methodical fashion have been gratified to find the time so spent has been well spent as it has come near to lifting their routine duties out of the slough of an arduous task.

Practically all other professions are so organized that the interchange of knowledge peculiar to their own work such as the deliberations of committees which formulate proposed standards for basic operations and place in publication the results of researches undertaken by scientific laboratories is effected in such a way as to result in the improvement of the quality of specifications produced and consequently in the professional and business standing of their office.

The American Specification Institute has been organized to improve all those conditions surrounding the writing of specifications and to bring to specification writers the benefits that are to be obtained from the organized efforts of men accustomed to write these essential documents. The scope of the Specification Institute has assumed a national and an even international character and

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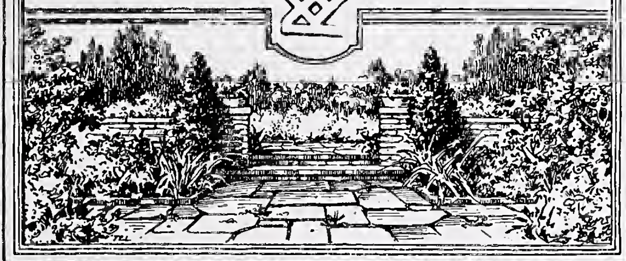

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the co-operation and membership of all those specification writers who prepare specifications for building construction and equipment are cordially invited.

The kinds of specifications that are to be studied and for the preparation of which informative data is being compiled and distributed to members, include those for buildings, engineering structures, and all works whatsoever in which materials of construction and labor are used; those for the installation and use of mechanical and electrical apparatus and equipment; those for sanitary apparatus and equipment; those for the fabrication and installation of all furnishings and furniture; those for all exterior and interior ornaments and ornamentation; those for road paving, planting, embellishing, and improvement of estates and waterways, and all those miscellaneous matters and things that are produced and offered for sale under specifications written by the architect or engineer.

The plans and scope of The American Specification Institute are based somewhat on the following analysis of the problems that enter into the preparation of specifications:

1. Definition of a Specification
   a. Qualitative—not quantitative

2. Elements of a Specification
   a. Economic values
   b. Limitation of alternatives
   c. Presentation of standards
   d. Description of materials, methods and their use
   e. Instructions to all concerned
   f. General conditions of contract
   g. Instructions to bidders

3. Classes of Specifications
   For a. Materials
   b. Methods
   c. Construction
   d. Equipment

4. Specifications Are Necessary to
   a. Architects
   b. Engineers
   c. Contractors
   d. Manufacturers
   e. Vendors
   f. Labor
   g. Owners
   h. Buyers
   i. Operators

5. Reason and Purpose of American Specification Institute
   a. To collect and distribute specification data
   b. To increase knowledge concerning specification data
   c. Field of specifications
   d. Co-operation with other organizations

6. Benefits to be Obtained
   a. The development of specification writers
   b. The development of specifications that will eliminate cause for argument and guesswork and lower the cost of building construction by eliminating waste of labor and materials.
   c. Professional recognition of specification writers

7. Membership
   a. Active Members
      1. Persons who devote their entire time or a part thereof to the writing of specifications
   b. Associate Members
      1. Testing and laboratory engineers
      2. Instructors in specification writing in architectural and engineering schools
   c. Honorary Members
      1. Persons who have rendered distinguished service to the art or science of specification writing
   d. Patrons
      1. Persons who contribute to the financial support of the Institute

8. Activities of Institute
   a. Study of Materials
      1. The production and physical properties of raw materials
      2. Methods of manufacturing, fabrication and finishing
      3. Relative value based on appearance, initial cost and maintenance, effect of combinations with other materials and proper materials for various types of buildings of varying grades.
   b. Methods of writing specifications
      1. The means of accomplishing complete co-operation between the drawings and specifications and determining
      What methods of construction and installation should be used;
      What the drawings should show or indicate;
      What should be omitted for inclusion in the specifications;
      2. The development of an outline or checking list
      3. The general contract conditions
      4. Specific requirements governed by local conditions

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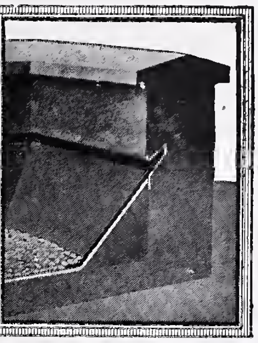

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5. Use of Standard Specifications of materials as prepared by societies and manufacturers
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7. The writing of specifications that are clear, concise, coherent and that can be understood by the courts
8. The principles of contract law as it affects the writing of specifications
9. Possible standardization of building codes

c. The securing of the adoption of recommended practices by the professions and others concerned

d. The deliberations of the Institute, discussions, treatises by members or invited contributors and other matters will be published.

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# DEPARTMENT OF SPECIFICATIONS

(*Continued from page* 120)

The contractor should be required to hoist all material of other contractors but should not provide labor for loading or unloading the hoist or else the responsibility for placing material on various floors should be borne directly by the contractors concerned. The plan adopted should be described accurately.

XII. Lines and Levels
  a. Lines, levels and bench marks should be checked, referred to established monuments and new work laid out in accordance therewith.

XIII. Public Protection
  a. Temporary walks
  b. Barricades
  c. Danger lights and signals
  d. Other means and methods.

XIV. Erection of Forms
  a. Types
    1. Floor and roof slabs
    2. Columns
    3. Walls
  b. Material used
    1. Wood
    2. Metal
  c. Adaptable to work where option to use either wood or metal forms is granted
  d. Fabrication of forms
    1. Erected substantially
    2. Structural design
    3. Lower shores footed on bearings that will not settle, loosen or be disturbed otherwise
    4. Each successive tier of shores to have bearing directly on shores below
    5. Braces and supports
    6. Tie wires, clamps, etc., to be arranged to allow re-tightening while pouring concrete.
    7. Cleaning and inspection holes at bottom of forms
    8. Provisions for hangers, inserts, etc. that penetrate or rest on forms
    9. Mouldings at corners to round or bevel concrete
    10. In all cases forms must be so built that their removal may be accomplished easily, without damage to concrete
    11. Special types of forms for particular parts of the work
  e. Cleaning of forms
    1. To be done upon completion and before reinforcing is placed
    2. Left broom clean in all cases
  f. Inspection of forms
    1. Location of all hangers, inserts, etc.
    2. Conformity to correct dimensions
    3. Plumb and level
    4. Bevel strips at corners
    5. Work placed by other contractors

(*To be continued*)

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# A CO-OPERATIVE SCHEME FOR A QUANTITY SURVEY

A METHOD for overcoming the only real obstacle there has been to the rapid adoption of quantity survey has been recently proposed. We refer to the payment for the quantity survey itself and the assumption that this should be made by the building owner, either directly or by arrangement with his architect whom he would reimburse.

Architects have been quick to recognize the advantages resulting from uniformity and accuracy in bidding quantities and the help offered by a surveyor's check on drawings and specifications for completeness and definiteness.

Contractors have likewise recognized the facility offered for bidding, the protection against quantity mistakes and the economy of reducing expense for bidding.

But there has been no easy way to arrange for the payment of the survey itself and consequently adoption of the plan of operation which is officially accepted has lagged.

To quote from the circular which brings this matter to our attention will perhaps be the simplest way clearly to explain this late development which calls for the co-operation of architect and contractor and would seem to have all the elements required for easy adoption and success. The quotation which follows was evidently intended to point out the position to be assumed by the architect in the matter and his offer of co-operation with his contractors.

> "Mr. Contractor:
>
> "We would like when asking for bids on competitive work, to make a quantity survey the required uniform basis of bids. We would like to do this for the greater facility it offers for judging bids and for awarding a contract. We believe it is a better basis for you, because it protects you against possible quantity errors, either your own or your competitors', and would interrupt preparation of other bids as little as possible.
>
> "We cannot fairly ask you to sign a contract for a bid based on another's quantities unless you have checked and accepted them. Furthermore, we do not wish it to be necessary for you to check them in order to bid, hence we would agree that a bidder can check the survey before signing a contract, and if he proves any errors to exist in it, can adjust his original bid price accordingly.
>
> "We can buy a quantity survey for twice what it costs in salary expense to make one. We are told that general contractors would be willing to pay this charge collectively provided we used the survey as stated above. The charge to each would obviously be very reasonable in itself, and the method would be protective.
>
> "We accordingly ask your attitude."

As intimated above, the architect is supposed to take the initiative and it is logical that he should, because unless he makes the survey the required uniform basis of bids, all the protective features are lost to bidders, and practically all the economy of it, because if contractors bought just the survey it could only be useful in checking their own privately prepared quantities. That would be small improvement over present methods.

Contractors could not force architects to adopt these measures without a general building strike which is ridiculous to contemplate. But every individual architect could easily initiate the method in his own practice by a declaration to his own circle of contractors of his desire to do so with their approval.

Of course, architects could force this method on contractors but that, it is believed, is unnecessary. From information obtainable it seems reasonable to assume that contractors requested to bid on a job will be very glad to co-operate provided the architect agrees to work the plan.

The method outlined seems to follow the line of least resistance. It eliminates the building owner from any discussion of the matter; it leaves payment for quantities with the bidders but at reduced rates, and with complete protection added.

Here, apparently, a practical solution for the adoption of quantity survey is offered. It seems desirable that architects should take steps toward applying this plan in their own practice. If this is done the plan as outlined will become a universal custom in a short time.

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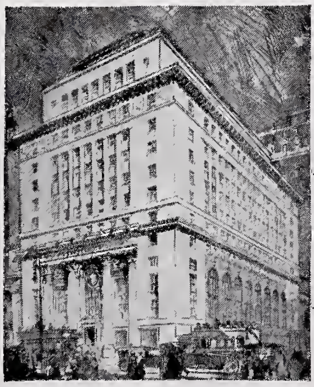

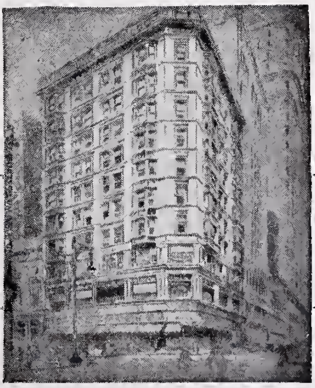

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# REFERENCE LIST OF BUSINESS LITERATURE

*A service arranged for the use of the Architect, Specification Writer, and Architectural Engineer.*

This list of the more important business literature of Manufacturers of building material and equipment is published each issue. Any of these publications may be had without charge, unless otherwise noted, by applying to The American Architect and The Architectural Review, 243 West 39th Street, New York, or obtained directly from the manufacturers. Either the titles or the numbers may be used in ordering.

---

### AIR CONDITIONING—See also Heating and Ventilation.

**The Bayley Manufacturing Company,** 732-760 Greenbush St., Milwaukee, Wis.

486. *Bulletin No.* 23. This bulletin is descriptive of the Bayley Turbo-Atomizer, the Bayley Turbo Air-Washer and Air Conditioner, for cleaning, cooling, tempering, humidifying and dehumidifying air. It contains an interesting treatise on air conditioning methods together with useful tables and a set of specifications. 38 pp. Ill. 7¾ x 10½ in.

### ASBESTOS—See also Lumber, -Roofing

**Johns-Manville Co.,** New York, N. Y.

372. *Catalog No.* 304. A treatise on the manufacture and uses of Johns-Manville Building Materials made of asbestos and mastic for all places exposed to fire or corrosion. 100 pp. Ill. in colors. Board covers. 8½ x 11 in.

### ASBESTOS ROOFING—See also Roofing

**The Philip Carey Co.,** Lockland, Cincinnati, Ohio.

380. *Asbestos versus Fire.* Booklet in colors. Contains information about asbestos; data on Carey Prepared and Built-up Asbestos Roofing; pictures of buildings on which they have been used. 16 pp. Ill. 6 x 9 in.

### ASH HOISTS—See also Hoists

**Gillis & Geoghegan,** 545 West Broadway, New York, N. Y.

329. *General Catalogue.* Contains specifications in two forms, (1) using manufacturer's name, and (2) without using manufacturer's name. Detail in ¼ in. scale for each telescopic model and special material handling section. Fully illustrated with photographs of actual installations and descriptive matter of same. 20 pp., 2 colors, 8½ in. x 11 in.

### ASH RECEIVERS

**Sharp Rotary Ash Receiver Corporation,** 396 Bridge St., Springfield, Mass.

205. *Catalogue E.* Booklet describing the Sharp Rotary Ash receiver with illustrations of houses in which the furnaces are equipped with this device. 24 pp. Ill. 6 x 9¼ in.

331. *Catalogue F.* A Booklet for architects and builders telling what the Sharp Rotary Ash Receiver is and what it does; together with tables of dimensions for installation. 8 pp. Ill. 6 x 9¼ in.

### BAKERY EQUIPMENT

**Read Machinery Company, Inc.,** York, Pa.

275. *Three Speed Kitchen Machine.* A booklet describing a useful apparatus for mixing cake batches, fancy pastries, mashing potatoes, sieving soups, crushing fruits and vegetables and for general whipping, creaming, beating and mixing duties in hotel and restaurant kitchens.

### BOILERS

**General Boilers Company,** Waukegan, Ill.

444. *Catalog No.* 7. A catalog completely describing the construction and operation of Pacific Steel Boilers. Contains also specifications and price lists. 32 pp. Ill. 6 x 9 in.

### BRICK

**American Face Brick Association,** 110 South Dearborn St., Chicago, Ill.

103. *The Story of Brick.* Contains the history of, and basic requirements of building brick, artistic, sanitary and economic reasons, comparative costs, and fire safety with photographs and drawings, and illustrates ancient and modern architectural works of note in brick. Size 7 x 9¼ in. 56 pp.

137. *A Manual of Face Brick Construction.* The history of brick making, types of face brick, showing details of construction for walls, chimneys and arches. Details of use of tile and brick Construction and different types of bonds are given. A series of plans and elevations of small brick houses, descriptions, useful tables and suggestions are illustrated and described. Size 8½ x 11 in. 116 pp. Price $1.00.

155. *The Home of Beauty.* A booklet containing fifty prize designs for small brick houses submitted in national competition by architects. Texts by Aymar Embury II, Architect. Size 8 x 10 in. 72 pp. Price 50 cents.

371. *Architectural Details in Brickwork. Series One, Two and Three.* Each series consists of an indexed folder case to fit standard vertical letter file, containing between 30 and 40 half tones in brown ink on fine quality paper. These collections are inspiring aids to all designers. Sent free to architects who apply on their office stationery; to others, 50 cents for each series.

454. *Bungalow and Small House Plans.* Four booklets containing plans for attractive small brick houses, containing 3-4, 5, 6, and 7-8 rooms. 60 pp. Ill. 8½ x 11 in. 25 cents each, $1.00 for the set.

### BUILDING CONSTRUCTION

**Concrete Engineering Co.,** Omaha, Neb.

347. *Handbook of Fireproof Construction.* An illustrated treatise on the design and construction of reinforced concrete floors with, and without suspended ceilings. The Meyer Steelform Construction is emphasized and tables are given of safe loads for ribbed concrete floors. 40 pp. Ill. 8½ x 11 in.

**McKeown Bros. Co.,** 21 East 40th St., New York, N. Y.

434. *Clear Floor Space.* A folder showing uses and advantages of McKeown "Lattis" and "Bowstring" long span wood roof trusses. 4 pp. Ill. 8½ x 11 in.

**Midwest Steel & Supply Co., Inc.,** 28 West 44th St., New York, N. Y.

F556. *Building Timber Joint Plates.* A pamphlet describing a toothed joint plate for use instead of dowels, wedges and drift pins in framing timber. 8 pp. Ill. 4 x 9 in.

**Truscon Steel Company,** Youngstown, Ohio.

317. *Truscon Floortyle Construction. Form D*-352. Contains complete data and illustrations of Floretyle installations. 16 pp. Ill. 8½ x 11 in.

318. *Truscon Standard Buildings. Form D*-398. Describes Truscon Standard Steel Buildings, with diagrams, illustrations of installations, descriptive matter and list of users. 48 pp. Ill. 8½ x 11 in.

319. *Truscon Building Products. Form D*-376. Contains a brief description of each of the Truscon Products. 112 pp. Ill. 8½ x 11 in.

320. *Modern School Construction. Form D*-396. Contains illustrations of schools, with typical elevations, showing advantages of Truscon Products for this construction. 16 pp. Ill. 8½ x 11 in.

### BUILDING HARDWARE—See Hardware

### BULLETIN BOARDS

**R. W. Clark Mfg. Co.,** 1774 Wilson Ave., Chicago, Ill.

443. *Own Your Directory* and *Bulletin Boards of Character and Service.* Two pamphlets describing the Clark Changeable Bulletin Boards and Directories for Hotels, Club Houses, Business Blocks, etc. Each 4 pp. Ill. 6¼ x 9½ in.

### CABINETS

**Hess Warming & Ventilating Co.,** 1204-7 Tacoma Building, Chicago, Ill.

386. *The Hess Sanitary Medicine Cabinet Lockers and Mirrors.* Description with details of an enamelled steel medicine cabinet for bathrooms. 20 pp. Ill. 4 x 6 in.

### CASEMENTS—See Doors and Windows

### CEILINGS, METAL

**The Edwards Manufacturing Company,** Cincinnati, O.

193. *Pamphlet* of 32 pages describing metal ceilings and wainscoting. Well illustrated, with list prices and rules for estimating. 7 x 10 in.

### CEMENT

**Carney Cement Company,** Mankato, Minn.

448. *The Bond That Guarantees the Wall.* Attractive catalog for architects, engineers, contractors and dealers. Describes fully the characteristics, durability and economy of this nature-mixed cement that requires no lime. Contains simple formula for mixing and illustrations of Carney-laid buildings. 20 pp. Ill. 8½ x 11 in.

**Krider Building Material Co., Inc.,** 422 East 3rd St., New York, N. Y.

418. *Durastone Brand Cement.* A description of a cement which matches any stone or marble, any color or texture. Can be cast in molds and also used for walls or plain surfaces. Illustrations are given of beautiful work executed with this material. 12 pp. 8½ x 11 in.

### CHUTES—See also Laundry Equipment

**Edwin A. Jackson & Bro., Inc.,** 50 Beekman St., New York.

171. Booklet showing general construction and size of chutes to receive coal. Two types are built into the foundation wall with glass panel in place of cellar window; another type is placed flush with the ground, and is placed adjacent to wall, or can be placed near the street curb. Size 3½ x 6¼ in. 16 pp.

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# REFERENCE LIST OF BUSINESS LITERATURE—Continued

### CLOCKS

**Landis Engineering and Manufacturing Co.,** Waynesboro, Penna.

469. *Frick Electric Time and Program System.* A collection of bulletins No. 100, 110, 120, 130, 150 and 160, dealing with master and secondary clocks, equipment, time stamps, etc. Bound in expansible filing cover of tough paper. 48 pp. Ill. 8½ x 11 in.

### COLUMNS

**Lally Column Co., of New York,** Calyer & Russell Sts., Brooklyn, N. Y.

122. *Lally Columns. Handbook.* Detailed construction diagrams for various types of steel construction. The text describes advantages of endurance and economy of the column. Various tests, tables of sizes, dimensions, weight, capacities and price given. Size 4¾ x 6½ in. 64 pp.

### CONDUITS—See Pipe

### DAMPPROOFING—See also Waterproofing

### DECORATIVE FABRICS

**Flambeau Shops, Inc.,** 7 East 39th St., New York, N. Y.

420. *Hand Woven Fabrics.* A four-page circular with an artistically designed cover describing the work of the Flambeau Shops, Inc. Here are woven in any combination of colors, or to any special design, fabrics to suit the decorative scheme of a client. This includes draperies, wall hangings, bed coverings, rugs, etc., all executed on hand looms.

### DOORS AND WINDOWS

**Art Metal Construction Company,** Jamestown, N. Y.

413. *The Interior System of Architectural Hollow Metal.* A loose leaf binder containing 38 sheets of details and 12 pages of description and specification of hollow metal doors, sash and trim.

**Crittall Casement Window Company,** 2703 E. Atwater Street, Detroit, Mich.

247. *Catalog No.* 18. *Crittall Universal Casements.* Contains complete description of steel casement windows for banks, schools, residences, churches, hospitals, etc., with details showing construction when set direct in masonry or with auxiliary frames. Sample specification enclosed 56 pp. Ill. 9 x 12 in.

**Dahlstrom Metallic Door Co.,** Buffalo and East 2nd St., Jamestown, N. Y.

201. *Architectural Portfolio.* A collection of various designs and types of Dahlstrom Doors, drawings and details of each style or type. Mailed free only to architectural offices. 30 pp. Ill. 14 x 18 in.

**Dahlstrom Metallic Door Co.,** Buffalo and East 2nd St., Jamestown, N. Y.

202 *Architectural Catalogue.* An illustrated catalogue showing standard styles and types of Dahlstrom hollow metal doors and interior trim. Various types of frames and other architectural shapes are also illustrated. 46 pp. 11 sections. 10 x 14 in.

**Detroit Steel Products Company,** Detroit, Mich.

F550. *More Daylight in your basement.* A booklet containing details and specifications for Fenestra basement windows. 16 pp. Ill. 3¾ x 8½ in.

**Henry Hope & Sons,** 103 Park Ave., New York.

65. *Hope's Casements and Leaded Glass.* Portfolio. Gives specifications, description and photo-engraving, of Hope Casements in English and American Architecture, full size details of outward and inward opening and pivoted casements, of residential and office types. Size 12¼ x 18½ in. 32 pp.

**Geo. W. Johnson Mfg. Co.,** Kansas City, Mo.

F538. *Catalog No.* 20. A book describing a number of types and styles of metal doors. Contains dimensioned detail drawings for use of designers with photographs of installations. In loose leaf form in binder. 44 pp. Ill. 8 x 11 in.

**The Kinnear Mfg. Co.,** Columbus, Ohio.

455. *Steel Rolling and Folding Doors and Shutters. Catalog No.* 52. This catalog is devoted to service doors adaptable to buildings of all classes, piers, factories, warehouses, etc. Illustrates their use and contains tables for designers and detailers. 96 pp. Ill. 8 x 11 in.

**The Lunken Window Company,** 4022 Cherry Street, Cincinnati, Ohio.

351. *Lunken Windows.* The Lunken Window allows a full 100% opening thus obtaining for a sash window all the merits, with none of the glaring demerits, of French windows. This booklet tells how this is done. 12 pp. Ill. 4 x 9½ in.

352. *Baby Book of Details for Lunken Windows.* One for heavy construction and one for light construction. Each book contains 20 pages of line drawings of details for use of draftsmen. Convenient pocket size. 3 x 5¼ in.

**Morgan Woodwork Organizations,** Oshkosh, Wis.

286 *Building with Assurance.* A complete treatise on standardized doors and woodwork for houses. It contains also articles by experts on Lighting, Heating, Plumbing, Interior Decorating, etc. Profusely illustrated with many plates in color. 436 pp. Flexible leatherette covers. 9 x 11 in.

**S. H. Pomeroy Company,** 282 East 134th St., New York N. Y.

293. *Underwriters' Laboratory Fire Retardant Windows.* A valuable book containing the Underwriters' specifications for fire retardant windows; at the same time being a complete catalog of windows built to meet the specifications. 67 pp. Ill. 6¼ x 8½ in.

**Roddis Lumber & Veneer Co.,** Marshfield, Wis.

146. *Roddis Flush Veneered Doors.* An illustrated booklet of buildings in which Roddis doors have been used, and a treatise on Roddis Standard Construction, showing sections and diagrams of doors, as well as photographs of many types of inlaid veneered doors in color. Technical information relative to staining and finishing of doors. Size 6 x 9¼ in. 100 pp.

**Truscon Steel Company,** Youngstown, Ohio.

315. *Truscon Steel Sash.* A catalog containing designing data, tables and views of Stock Sash installations. 6 pp. Ill. 8½ x 11 in.

348. *Truscon Steel Sash.* This handbook has been prepared for detailers and specification writers. The descriptions are clear and the details are complete. 80 pp. Ill. 8½ x 11 in.

**The J. G. Wilson Corporation,** 8 West 40th St., New York City.

464. *Rolling Doors ond Shutters.* A practical book on warehouse, freight house and store doors and shutters of the rolling, swing and sliding types. Contains line drawings and half-tones. 8 pp. Ill. 9 x 12 in.

### DRAFTING MATERIALS

**American Lead Pencil Co.,** 220 Fifth Ave., New York, N. Y.

268. *Booklet C-20. Venus Pencil in Mechanical Drafting.* An interesting illustrated booklet showing the possibilities of the Venus Drawing Pencil for drafting. 6 x 9 in.

**Economy Drawing Table Company,** Toledo, Ohio.

F531. *Catalog "N."* A catalog of drawing boards, drawing tables, filing cases, chairs, T-squares, etc. 32 pp. Ill. 7 x 10 in.

### DRAINS—See also Plumbing Equipment

### DRAINS—FLOOR

**Crampton Farley Brass Co.,** 221 Main St., Kansas City, Mo.

194. Several pamphlets describing various types of floor and area-way drains. 3½ x 6¼ in.

### DRYERS

**Airdry Corporation,** Groton, N. Y.

480. *Airdry, The Electric Towel.* This booklet describes a machine which supplants all kinds of towels in offices, hotels, stores, etc. Data are given of cost of operation compared with towels with a list of users. 10 pp. Ill. 8 x 11 in.

### DUMBWAITERS—See also Elevators

**Sedgwick Machine Works,** 144 West 15th Street, New York.

60. *Hand Power Elevators and Dumbwaiters in Modern Architectural Construction.* Illustrated catalogue. 4¼ x 8¼ in. 80 pp.

### ELECTRICAL EQUIPMENT—See also Lighting

**Frank Adam Electric Co.,** St. Louis, Mo.

296. *Catalog No.* 25. A catalog and price list of knife switches switch boards, panel boards, steel cabinets, switch board material. 83 pp. Ill. 8 x 10½ in.

**Harvey Hubbell, Inc.,** Bridgeport, Conn.

297. *Electrical Specialties. Catalog No.* 17, 1921. This catalog contains descriptions with prices of the thousand and one items connected with electric light, electrical alarm and small electrical appliance installations in modern buildings. 104 pp. Ill. 8 x 10½ in.

**National Metal Molding Co.,** Pittsburgh, Pa.

481. *Liberty Rubber Insulated Wires, Cables and Cords.* A descriptive catalog of insulated wires, cables and cords for electric wiring. Contains much special information together with useful tables. 20 pp. Ill. 6 x 9 in.

### ELEVATORS—See also Dumbwaiters and Hoists

**American Elevator & Machine Co.,** Louisville, Ky.

196. *Illustrated Catalogue* showing elevator equipment for various uses. 32 pp. 8½ x 9½ in.

**Elevator Locks Co.,** 119 No. Washington St., Peoria, Ill.

338. *A Sign of Safety.* Describes devices for mechanically locking power and automatically locking gates of elevators, and control landing. Contains also list of users of this equipment. 26 pp. Ill. 4 x 9½ in.

**Kimball Brothers Company,** Council Bluffs, Iowa.

330. *Kimball Elevators.* An illustrated catalog of hand power, sidewalk, and garage elevators and dumbwaiters and electric passenger, freight and push button elevators. 32 pp. Ill. 7¾ x 10½ in.

**Otis Elevator Co.,** 260 Eleventh Ave., New York, N. Y.

261. *Electric Traction Elevators.* An illustrated catalog describing gearless traction elevators. 28 pp. 8½ x 11 in.; and an illustrated catalog describing worm gear traction elevators. 24 pp. 6 x 9 in.

**Richards-Wilcox Mfg. Co.,** Aurora, Ill.

335. *"Ideal" Elevator Door Equipment.* Catalog showing elevator door hangers for one, two and three speed doors, also doors in pairs and combination swing and slide doors. Door closers and checks. 24 pp. Ill. 8½ x 11 in.

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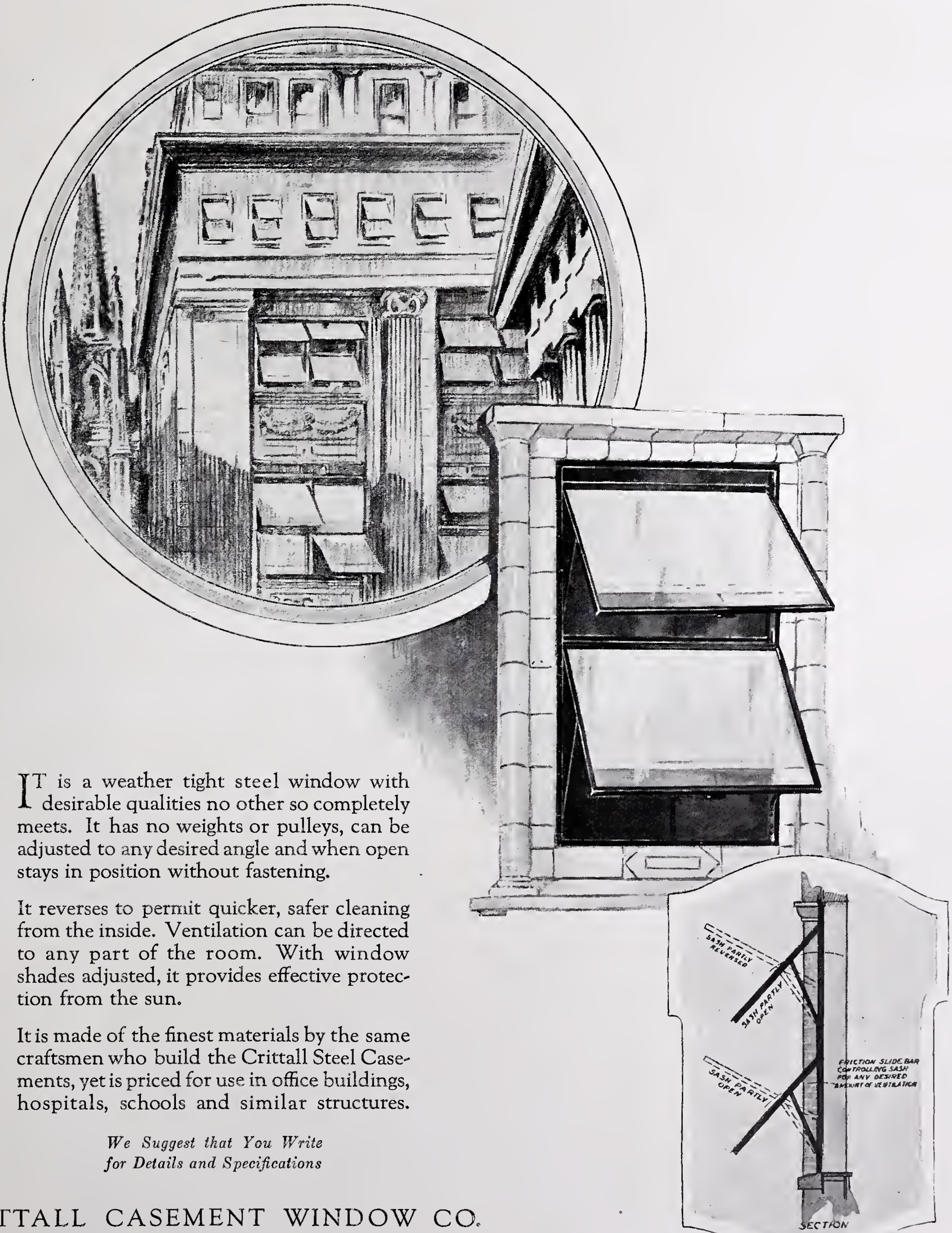
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## REFERENCE LIST OF BUSINESS LITERATURE—Continued

### ELEVATORS—See also Dumbwaiters and Hoists

**A. B. See Electric Elevator Co.,** 52 Vesey St., New York.
**169.** Photographs and description in detail of elevator equipment manufactured by the A. B. See Electric Elevator Co. Size 6 x 8 in.

### ESCALATORS

**Otis Elevator Co.,** 260 Eleventh Ave., New York, N. Y.
**263.** *Escalators.* An illustrated catalog describing escalators, with layouts of typical installations. 36 pp. 6 x 9 in.

### FINANCING OF ENTERPRISES

**The Hockenbury System, Incorporated,** Penn-Harris Trust Building, Harrisburg, Pa.

**313.** *Your Hospital and Its Financing.* An educational work on how to finance a new hospital project and obtain funds for needed extensions to existing institutions. Illustrations are given of six institutions in five states financed by the methods, and through the work of the Hockenbury specialists. 20 pp. Ill. 4¼ x 8½ in.

**314.** *Financing Your City's New Hotel.* A plan is here offered to the enterprising architect whereby his ideas for a new hotel for his home city may be realized. Hotels financed through the work of the Hockenbury specialists are shown, together with testimonials from local business men. 20 pp. Ill. 4¼ x 8½ in.

**S. W. Straus & Co.,** 565 Fifth Ave., New York, N. Y.
**183R.** *Forty Years Without Loss to Any Investor.* A book describing the Straus Plan of investments. This firm underwrites and sells only first mortgage serial bonds secured by newly improved income producing properties, or high grade industrial properties. 37 pp. Ill. 5 x 8 in.

### FIRE DOORS AND SHUTTERS—See Doors and Windows

### FIREPLACES AND MANTELS

**Chattanooga Roofing and Foundry Co.,** Chattanooga, Tenn.

**143.** *The Magic Hearth.* Leaflets. With instructions to build an open fireplace, section drawings, illustrations of fireplace equipment grates, firebacks, cranes, andirons, etc. Size 8½ x 11 in. 10 pp.

**Colonial Fireplace Company,** 4611 West Roosevelt Road, Chicago, Ill.
**479.** *Fireplace Equipment.* A catalog and price list of andirons, modern dampers, fenders, fire-sets, screens, thresholds, etc., together with valuable information about the proper construction of fireplaces. 20 pp. Ill. 8½ x 11 in.

**H. W. Covert Co.,** 137 East 46th St., New York.
**79.** *Hints on Fireplace Construction.* Diagrams of construction, and installation of Covert "Improved" and "Old Style" dampers and smoke-chambers, and other fireplace accessories. Size 5⅝ x 8½ in. 12 pp.

**Edwin A. Jackson & Bro., Inc.,** 50 Beekman St., New York.

**92.** *Dampers, Chutes, Doors and Dumps.* Illustrated catalog. Equipment and appurtenances of various types, construction and installation, data, dimensions and prices.

**106.** *Franklin Stoves.* Illustrated booklet containing plans, sections and photographs of this Colonial stove, including type heating on two floors. 12 pp. 7 x 7 in.

### FIRE PROTECTION EQUIPMENT

**Foamite Firefoam Company,** 151 Fifth Ave., New York City.

**449.** *The Why of Portable Fire Extinguishers by Frank A. Epps, A.S.M.E., N.F.P.A.* A discussion of four types of portable fire extinguishers with quotations from reports made by the Underwriters' Laboratories. 6 pp. 4 x 8 in.

**Foamite Firefoam Company,** 151 Fifth Ave., New York City.

**450.** *Firefoam. What It Is and What It Does.* A description of a fire-smothering agent which blankets all burning objects; clings to all burning substances; floats on any burning liquid. 6 pp. Ill. 4 x 8 in.

**Jiffy Fire Hose Rack Co.,** 133 West 52nd St., New York, N. Y.

**266.** *Stand Pipe Equipment.* An illustrated catalog showing complete installations of stand pipe equipment. 31 pp. 7 x 9 in.

### FLOORING, SUB—See also Stucco Base

### FLOORING

**Armstrong Cork Co., Linoleum Department,** Lancaster, Pa.
**222.** *Business Floors.* A handy reference on floors for public and semi-public buildings, containing specimen specifications, directions for laying and other helpful data. Illustrated in color. 6 x 9 in.

**Congoleum Company, Inc.,** Philadelphia, Pa
**428.** *The Gold Seal Specification.* Contains specifications for laying Linoleum and Cork Carpet according to methods perfected after years of experiment and careful research. 2 pp. 8½ x 11 in.

**Congoleum Company, Inc.,** Philadelphia, Pa.
**429.** *Linoleum Service Sheet,* 1: *No.* 40. A sheet containing detail sketches drawn to scale for applying linoleum to floors; over thresholds; on staircases; under radiators; etc. The reverse contains description of materials and complete detailed specifications for laying linoleum. 17 x 22 in., folded to 8½ x 11 in.

**The Long-Bell Lumber Co.,** R. A. Long Building, Kansas City, Mo.
**204.** *The Perfect Floor.* Tells how to lay, finish and care for Oak Flooring. 16 pp. 14 Illus. 5⅛ x 7⅝ in.

**The Marbleloid Co.,** 461 Eighth Ave., New York.
**61.** *The Universal Flooring for Modern Buildings.* Illustrated booklet. Describes uses and contains specifications for Marbleloid flooring, base, wainscoting, etc. Size 6¾ x 9¾ in. 32 pp.

**Franklin R. Muller Co.,** Waukegan, Ill.
**242.** *Asbestone Flooring Composition.* A book describing uses of and giving specifications and directions for Composition Flooring, Base, Wainscoting, etc. 8½ x 11 in. Ill.

**Oak Flooring Advertising Bureau,** 1014 Ashland Block, Chicago, Ill.
**493.** *Modern Oak Floors.* A book that tells the complete story of Oak Flooring. 24 pp. Ill. 6⅛ x 9¼ in.

**W. & J. Sloane,** Selling Agents, New York, N. Y.
**439.** *Nairn Inlaid and Printed Linoleum.* A 68-page book illustrated in colors. Shows patterns of linoleums with views of attractive interiors in which linoleum covered floors form part of the decorative scheme. 6 x 9 in.
**440.** *Nairn Samples.* A sample book of plain linoleum and one of cork carpet, each 4¾ x 8¼ in., bound in cloth. A third sample book contains samples of inlaid and printed linoleum. 3 x 6 in.

### FLOORS—See Building Construction

### FURNACES—See Heating

### FURNITURE

**Empire Seating Company, Inc.,** Rochester, N. Y.
**F521.** *Progressive School Seating.* A description of the "Empire seat desk"; a chair with adjustable board to serve as school desk or drawing board and permitting several adjustments. 12 pp. Ill. 7¾ x 10 in.

**William Leavens & Co., Inc.,** 32 Canal Street, Boston, Mass.
**F542.** *Furniture Sheets.* A collection of sheets illustrating furniture made by this company. Price list on request. 6 x 9 in.

### GARAGE CONSTRUCTION—See also Building Construction

### GARBAGE DESTROYERS

**Kerner Incinerator Company,** 1029 Chestnut St., Milwaukee, Wis.
**384.** *The Sanitary Elimination of Household Waste. M-3 Folder.* Description of construction, installation and operation of the Kernerator for residences. Illustrated by views of residences in which the Kernerator is installed, with cuts showing all details. 15 pp. Ill. 4 x 9 in.

### GARBAGE RECEIVERS

**Edwin A. Jackson & Bro., Inc.,** 50 Beekman St., New York.
**170.** Booklet showing general construction and sizes of garbage receivers to be placed underground for suburban use; also types to be built into the wall of city homes and apartments; also types for suburban wall with opening on inside for the maid and outside for the garbage man. Size 3½ x 6¼ in. 16 pp.

### GARDENS

**Julius Roehrs Company,** Rutherford, N. J.
**406.** The Ten-Ten books issued three times a year—covering nursery stock in general, such things as fruit trees, roses and perennials. Also one general greenhouse catalog, listing orchids and greenhouse plants.

### GREEN HOUSES—See Glass Constructions

### GUTTERS AND DOWNSPOUTS—See also Roofing.

**The New Jersey Zinc Co.,** 160 Front Street, New York, N. Y.
**226.** *Zinc Spouting.* Describes leaders, gutters, etc., "Made from Horse Head Zinc," giving information concerning their economy and durability. 8 pp. Ill. 6 x 9 in.

### GYPSUM BLOCKS

**Acme Cement Plaster Co.,** St. Louis, Mo.
**F547.** *Acme Gypsum Blocks.* A descriptive booklet dealing with gypsum blocks for partitions and column protection, also reinforced blocks for lintels. Contains complete specifications with examples of use in important buildings, 30 pp. Ill. 4 x 9 in.

### HARDWARE

**The American Pulley Co.,** Philadelphia, Pa.
**F530.** *Sash Pulleys of Pressed Metal.* A catalog of pressed steel sash pulleys for all sizes and styles of windows. 44 pp. Ill. 5½ x 7½ in.

**The Bassick Company,** Bridgeport, Conn.
**F510.** *Catalog No.* 100. A complete catalog of casters for every use from small trunks to heavy trucks including also furniture. 80 pp. Ill. 7¾ x 10¾ in.

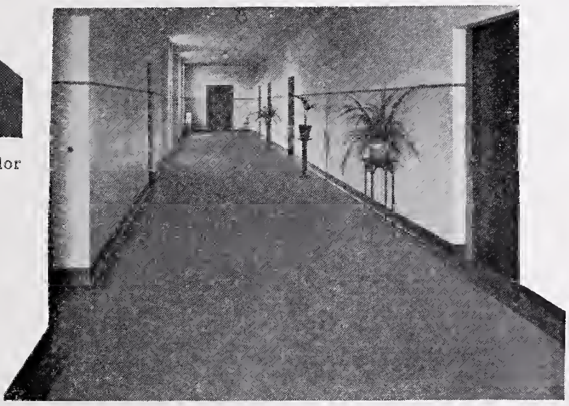
# CORRIDOR FLOORS

IDEAL corridor floors are those of Marbleloid *Permanent* Flooring. First of all they are attractive and substantial in appearance. They are fireproof, and they are installed to wear as long as the building stands.

A Marbleloid corridor floor will minimize the sound of footfalls. It will offer a sure foothold. It will be resilient. It will not "dust" or "chip" or require expensive upkeep. It will be sanitary and quickly cleaned.

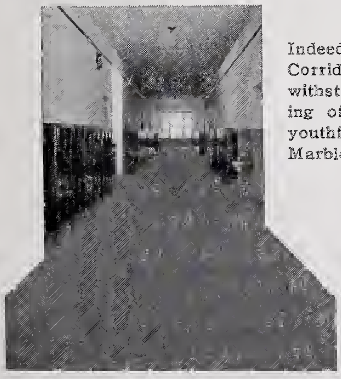
If all the corridor floors of Marbleloid flooring could be laid end to end they would form an ideal walk of many miles in length. You will find them now in Schools, Hospitals, Colleges, Dormitories, Courthouses, Clubs, Apartments, Institutions, Residences, and Office, Y.M.C.A. and Public Buildings.

The Marbleloid floor adds to the richness of this Corridor in an Eastern Club House.



The cheerfulness of this Hospital Corridor is enhanced by its Marbleloid floor with continuous base-board in different color.

Serviceability is a paramount requirement of this Marbleloid Corridor floor in a Technical Institute.



Indeed this School Corridor floor will withstand the tramping of thousands of youthful feet. It is of Marbleloid.

*Architects will find specifications in Sweet's Architectural and Engineering Catalogues. We will also send on request samples of Marbleloid Flooring, partial list of installations and other particulars.*

**THE MARBLELOID COMPANY, 463 Eighth Ave., New York, N. Y.**

# MARBLELOID

The Universal FLOORING
for Modern Buildings

# REFERENCE LIST OF BUSINESS LITERATURE—Continued

## HARDWARE

**Carrier Adjuster Company,** Asheville, N. C.

**470.** *Carrier Quadrant Adjuster.* A description, with specifications and detail line drawings, of an adjuster for outward opening casement windows. Locks window at any angle without interference with screens or draperies and permits cleaning of entire window from the inside. Permits 100% opening for ventilation. 4 pp. Ill. 8½ x 11 in.

**The Casement Hardware Co.,** 5 North La Salle Street, Chicago, Ill.

**489.** *"Win-dor" Catalog.* A pamphlet describing Bull-dog adjusters and Hook-fast fasteners for casement windows. 88 pp. Ill. 8¼ x 10½ in.

**490.** *The Casement Window Hand-book.* A book dealing with the advantages of casement windows and describing casement window hardware. 30 pp. Ill. 4¼ x 5¼ in.

**The Kawneer Co.,** Niles, Mich.

**142.** *Kawneer, Simplex Window Fixtures.* Booklet illustrated. Drawings, photographs and text describes weightless, reversible window fixture, its ease of installation, ventilation and light control. Size 8½ x 10¾ in. 16 pp.

**Knape & Vogt Manufacturing Company,** Grand Rapids, Mich.

**471.** *Hardware Catalog No. 10.* A complete catalog of hardware for home closets, garment holders, show cases, cabinets, desks and furniture. 110 pp. Ill. 6 x 9 in.

**Monarch Metal Products Co.,** 5020 Penrose St., St. Louis, Mo.

**438.** *Monarch Casement Hardware.* A book describing hardware for casement windows. This Manual and folder comply with all suggestions made by the Structural Service Committee of the A. I. A. 18 pp. Ill. 7½ x 10½ in., in heavy folder for vertical file properly indexed.

**Pullman Mfg. Co.,** 220 South Ave., Rochester, N. Y.

**485.** *Pullman Unit Sash Balances.* The Pullman Unit Sash Balance is a coiled spring in a housing that replaces weights and cords. This book tells why it costs less on nearly all installations; why it is better in all respects; and gives a list of important buildings in which this balance is in satisfactory use. Contains blue print sheet of details. 12 pp. Ill. 8 x 11 in.

**Richards-Wilcox Mfg. Co.,** Aurora, Ill.

**336.** *Modern Hardware for Your Home.* Catalog of hangers for vanishing French doors; "Air-Way" multifold hardware for sun parlors and sleeping porches; "Slidetite" garage door hardware. 24 pp. Ill. 8½ x 11 in.

**435.** *Distinctive Garage Door Hardware. Catalog No. A-22.* This is more than a catalog. It is a treatise for architects and builders on the door equipment of garages, covering sliding, folding and combination sliding and folding doors, with their hardware. 94 pp. Ill. 8½ x 11 in.

**436.** *Sliding Door Hardware. Catalog No. A-17.* A catalog of sliding door hardware of Parallel, Accordion and Flush Door partitions. 32 pp. Ill. 7 x 10 in.

**Sargent & Company,** New Haven, Conn.

**478.** *Sargent Locks and Hardware, 1922.* The latest complete catalog of locks, hardware, small tools, etc. 1018 pp. Ill. 9 x 12 in.

**The Stanley Works,** New Britain, Conn.

**11.** *Wrought Hardware. New 1921 Catalog.* This new catalog describes additions to the Stanley line of Wrought Hardware, as well as the older well known specialties and various styles of butts, hinges, bolts, etc. 376 pp. Ill. 6½ x 9½ in.

**12.** *Garage Hardware.* Booklet, illustrated. Garages and their equipment, such as hinges, hasps, door holders, latch sets, chain and hand bolts, showing illustrations and text with dimensions of garages, describing the Stanley Works product. Size 6 x 9 in. 24 pp.

**13.** *Eight Garages and Their Stanley Hardware.* Booklet. Plans, drawings and complete hardware specifications. Size 5 x 7 in. 32 pp.

**127.** *The Stanley Works Ball Bearing Butts.* Booklet, illustrated. Description, with full size illustrations of many typed butts and their parts, dimensions and finish. Size 5 x 7½ in. 32 pp.

**495.** *Stanley Detail Manual.* A catalog in loose leaf binder, consisting of five sections on Butts, Bolts, Blind and Shutter Hardware, Stanley Garage Hardware, Screen and Sash Hardware. Detail drawings are given, showing clearances and other data needed by detailers. 116 pp. Ill. 7½ x 10½ in.

**Vonnegut Hardware Co.,** Indianapolis, Ind.

**309** *Von Duprin Self-Releasing Fire Exit Devices.* A catalog and educational work on panic-proof, burglar-proof self releasing exit devices for doors and windows of buildings of any kind of occupancy. 41 pp. Ill. 8 x 11 in.

**310.** *Prince Self-Releasing Fire Exit Devices. Supplement to Van Duprin Catalog No.* 12. Contains valuable information for architects on the selection, detailing, etc., of Prince devices for doors and windows to insure safety against fire panic. 32 pp. Ill. 8 x 11 in.

## HEATERS—See Water Heaters

## HEATING

**Alberger Heater Company,** Buffalo, N. Y.

**307** *Heating and Cooling Equipment. Catalog No.* 3. A useful manual for architects in addition to serving as a catalogue of heating and cooling equipment. Explains fully the advantages of spirally corrugated heater tubing. 48 pp. Ill. with line cuts and half tones. 7¾ x 10¾ in.

**American District Steam Co.,** North Tonawanda, N. Y.

**421.** *ADSCO.* Bulletin 158 tells in an interesting way about modern heating. 16 pp. Bulletin 159 gives valuable data for calculating radiation required in building. Tells how old systems may be remodelled to bring temperature in each room under perfect control. 16 pp. Both bulletins illustrated. 6 x 9 in.

**American Radiator Company,** 104-108 W. 42nd St., New York, N. Y.

**427.** *Ideal-Arcola Heating Outfits.* A book describing a system of hot water heating for small and medium size houses. The boiler is placed in a room and resembles a stove. No cellar required. The ash carrying reduced to a minimum. 24 pp. Ill. 6 x 8½ in.

**Crane Company,** 836 So. Michigan Ave., Chicago, Ill.

**241.** *Steam Catalogue.* A book containing full descriptions of the complete line of Crane valves, fittings, etc., 800 pp. Ill. 6 x 9 in.

**The Farquhar Furnace Company,** Wilmington, Ohio.

**355.** *Healthful Helpful Hints.* A discussion of furnace and chimney design and capacity for hot air heating and ventilation. 16 pp. Ill. 4¾ x 9¼ in.

**356.** *A Plain Presentation to Dealers.* A book of selling talk for dealers in Farquhar Furnaces. Four model heating layouts are shown and there is a page of useful "Do and Don't" advice. 24 pp. Ill. 8½ x 11 in.

**Hess Warming & Ventilating Co.,** 1209 Tacoma Bldg., Chicago, Ill.

**178.** *Modern Furnace Heating.* An illustrated book on the Hess Welded Steel Furnaces, Pipe and Pipeless, notes for installation, sectional views, showing parts and operation, dimensions, register designs, pipes and fittings. Size 6 x 9½ in. 48 pp.

**Illinois Engineering Company,** Racine Ave. at 21st St., Chicago, Ill.

**F540.** *Illinois Heating Systems. Vapor Details Bulletin 20.* This bulletin contains typical plans and elevations of heating systems, with descriptions of details and "Standards for Computing Radiation and Boiler Sizes" of the Chicago Master Steam Fitters Association. 18 pp. Ill. 8 x 10¾ in.

**Jenkins Bros.,** 80 White St., New York, N. Y.

**235.** *Catalog No. 21.* This catalog contains descriptions of all the valves, packing, etc., manufactured by Jenkins Bros. Includes also dimensions and price lists of valves and parts. 271 pp. Ill. 4 x 6¾ in. Stiff paper cover.

**237.** *The Valve Behind a Good Heating System.* This booklet describes Jenkins Radiator Valves, Automatic Air Valves and other valves used in connection with steam and hot water heating. 16 pp. Ill. 4½ x 7¼ in. Stiff paper cover.

**Johnson Service Company,** 149 Michigan St., Milwaukee, Wis.

**391.** *The Regulation of Temperature and Humidity.* A description of the Johnson System of temperature regulation and humidity control for buildings; showing many kinds of thermostatic appliances for automatically maintaining uniform temperatures. 63 pp. Ill. 8½ x 11 in.

**392.** *Johnson Electric Thermostats, Valves and Controllers.* A catalog of devices mentioned in the title. 24 pp. Ill. 3½ x 6 in.

**L. J. Mueller Furnace Co.,** Reed and Florida Streets, Milwaukee, Wis.

**F549.** *Mueller Furnace.* A catalog of hot air furnaces, combination air and water heaters and Mueller convectors for all fuels. Contains tables of capacities, rules for figuring radiation and line drawings of installations. 88 pp. Ill. 7 x 10 in.

**Richardson & Boynton Co.,** New York, N. Y., Chicago, Ill., Philadelphia, Pa., Providence, R. I., Boston, Mass.

**290.** *The Richardson Vapor-Vacuum-Pressure Heating System.* An interesting book which presents in clear non-technical language the principles of Vapor-Vacuum-Pressure heating; the economy over ordinary steam heating; steam and hot-water systems may be altered to use this principle with views of buildings where the V-V-P system is installed. 14 pp. Ill. 8 x 11 in.

**291.** *Perfect Warm Air Furnaces. No.* 203. Contains a full description of various types of warm air furnaces and parts, with dimensions and necessary data. 24 pp. Ill. 8 x 10½ in.

**292.** *Perfect Cooking Ranges.* Description and dimensions of the complete line of the new high enamel finish Richardson Perfect ranges, with charts and information regarding combination coal and gas cooking ranges. 40 pp. Ill. 8½ x 11 in.

**The H. B. Smith Co.,** Westfield, Mass.

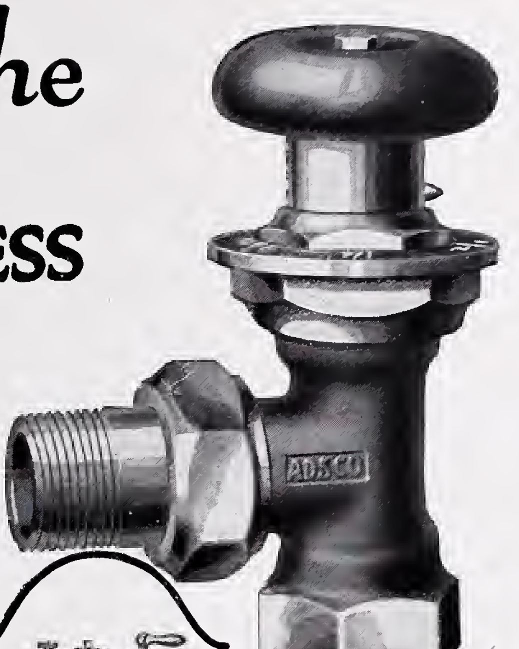
**431.** *General Boiler & Radiator Catalog.* A descriptive catalog giving ratings, dimensions, capacities and working pressures. 90 pp. Ill. 4 x 7 in.

**432** *Heating Data Books.* One is an Engineers' Data Ring Book. 125 pp. Ill. 4 x 7 in. Others consist of loose leaf binders to hold special matter. 8½ x 11 in.

**Sterling Engineering Company,** 419 Third St., Milwaukee, Wis.

**430.** *Sterling Bulletins.* No. 33 describes the Sterling System of vacuum heating. 11 pp. No. 32 describes the Sterling System of vapor heating. 14 pp. No. 31 describes the Sterling slide valve return trap 4 pp. They are all illustrated. 6 x 9 in.

# Announcing the ADSCO GRADUATED PACKLESS Radiator Valve



This valve is a great refinement of the well-known Adsco Graduated Radiator Valve at no advance in price.

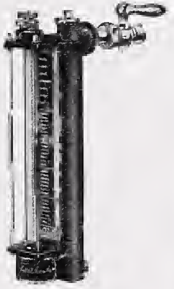
It has closer graduation, especially on small openings. It is therefore more positive in control. It is made entirely in our own plant and is thoroughly inspected and guaranteed. The black dial with nickel lettering, and general appearance are more attractive. Because of design and careful construction safety against corrosion and sediment is assured. It can be used with any steam or vapor system with better results than any other make of radiator valve graduated or otherwise.

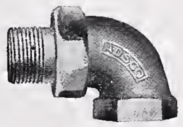
It has been especially developed for use in the Adsco System of Atmospheric Steam Heating in conjunction with the Adsco Damper Regulator, Safety Valve, Mercury Gauge and Union Elbow; with any type of boiler or steam supply, and any suitable type of radiation. This principle of heating needs no traps, vacuum pumps or other complicated devices; their cost is saved.

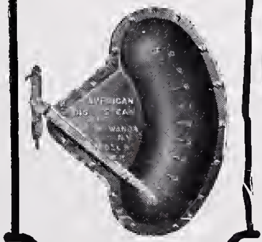
The Adsco Graduated Packless Radiator Valve is furnished to heating contractors at a uniform price. Unlike many makes of competitive vapor specialties, it is sold on a merchandise basis and not thru lumping the price in connection with engineering specifications.

When desired, our engineering service will be furnished to architects or contractors at a moderate fee independent of unit prices for the specialties required.

Write for Bulletin No. 158-A covering Adsco Heating for individual buildings, and including the Adsco Specialties; Bulletin No. 20-A covers Adsco Community Heating of a group of buildings from Central Station Heating Plant. Architects, engineers and heating contractors should also ask for Bulletin No. 159-A.







Residence of
J. M. G. Brown,
Morgantown, W. Va.
Adsco Heating — Steam from individual boilers.

Higley Bldg.,
Cedar Rapids, Ia.
Adsco Heating — Steam from Central Heating Station

**AMERICAN DISTRICT STEAM COMPANY**
GENERAL OFFICES AND WORKS
NORTH TONAWANDA, N.Y.

Offices:
**St. Paul Chicago New York Pittsburgh Seattle**

# ADSCO HEATING

## REFERENCE LIST OF BUSINESS LITERATURE—Continued

### HEATING

**Tuttle & Bailey Mfg. Co.,** 2 West 45th St., New York, N. Y.

395. *About Radiator Enclosures.* A book showing how easily and effectively unsightly radiators may be concealed by enclosures which adorn a room. 15 pp. Ill. 6¾ x 9¾ in.

396. *Special Designs. Catalog 66A.* A book of designs for grilles, screens, registers and ventilators to be used in connection with heating installations. Made of bronze, brass, iron and steel. 40 pp. Ill. 6¾ x 9¾ in.

### HEATING AND VENTILATION

**American Blower Co.,** Detroit, Mich.

361. *Sirocco Service.* A monthly publication containing descriptions of heating and ventilating systems installed by the American Blower Company, together with useful data for architects and engineers. 16 pp. Ill. 8½ x 11 in.

362. *General Catalog "ABC" Products.* A book full of useful data for all men who have to deal with heating and ventilating problems. 132 pp. Ill. 8½ x 11 in.

**Buffalo Forge Co., 490 Broadway,** Buffalo, N. Y.

215. *Buffalo Fan System of Heating, Ventilating and Humidifying.* Catalog 700. This contains a general discussion of heating and ventilating under four heads: Part 1, Public Buildings. Part 2, Industrial Plants. Part 3, Buffalo Apparatus. Part 4, Fan Engineering.

**The H. W. Nelson Corporation (formerly Moline Heat),** Moline, Ill.

411. *Univent Ventilation. Architects' and Engineers' Edition.* A scientific treatise on ventilation for schools, offices and similar buildings; with 40 pages of engineering data on ventilation for architects and engineers. 72 pp. Also "Supplement A" on Air Conditioning. 12 pp. Ill. with half-tones, line drawings and designing charts. 8½x11 in.

### HEAT REGULATORS

**Minneapolis Heat Regulator Co.,** Minneapolis, Minn.

134. *The Heart of the Heating Plant.* An illustrated catalog, describing the Minneapolis Heat Regulator, its construction, application and operation for the automatic control of temperature where coal, gas, fuel oil or street steam is used. Complete catalog and list prices. Size 6 x 9 in. 20 pp.

### HOISTS—See Elevators and Ash Hoists

### INCINERATORS—See Garbage Destroyers

### INSULATION—See also Stucco Base

**Insulite Division, Minnesota & Ontario Paper Company,** International Falls, Minn.

487. *Universal Insulite in Building Construction.* Describes a clean, sanitary, odorless and vermin proof board made from selected waterproofed wood fibres, felted into light, strong, uniform sheets. Examples are given of use indoors and outdoors, together with details and useful data. 37 pp. Ill. 8½ x 11 in.

**United States Mineral Wool Co.,** 280 Madison Ave., New York.

83. *The Uses of Mineral Wool in Architecture.* Illustrated booklet. Properties of insulation against heat, frost, sound, and as a fire-proofing, with section drawings and specifications for use. It gives rule for estimate and cost. Size 5¼ x 6⅝ in. 24 pp.

### IRON AND STEEL—See also Metals

**The American Rolling Mill Co.,** Middletown, Ohio.

233. *Armo in Picture and Fact.* A booklet describing the manufacture of pure iron in sheets and giving useful tables of sheet sizes and weights. 247 pp. Ill. 6 x 9 in.

234. *Why Steel and Iron Rust.* A booklet full of interesting data. 16 pp. Ill. 3¼ x 6¼ in.

**Mitchell-Tappen Company,** 15 John St., New York, N. Y.

257. *Booklet 14 on Standardized Metal Caging.* Description of various ways of reinforcing the concrete fireproofing on structural steel work, with particular reference to Standardized Metal Caging.

### KITCHEN EQUIPMENT

**Bramhall, Deane Co.,** 261-A West 36th St., New York.

59. *The Heart of the Home.* Booklet, illustrated. Deane's French Ranges (all fuels), cook's tables and plate warmers. Size 6 x 9 in. 32 pp.

**The Prometheus Electric Co.,** 513 West 42nd St., New York.

145. *Prometheus Electric Plate Warmers.* Leaflets illustrating the plate warmer, describing its construction, utility and types, adaptable for residences and hotels, according to specifications. Sizes and dimensions. Size 5⅝ x 9 in.

### LATH, METAL

**American Steel & Wire Co.,** Chicago, Ill.

228. *Stucco Houses Reinforced With Triangle Mesh Fabric.* A pamphlet containing valuable data on stucco work with tables of quantities of materials and many illustrations of houses covered with stucco applied on Triangle Mesb Fabric. 24 pp. Ill. 6 x 9 in.

**Concrete Engineering Co.,** Omaha, Neb.

346. *How to Use Ceco Lathing Materials.* An illustrated treatise on the use of expanded metal lath. Contains construction details and complete specifications, with sample piece of lath in pocket on cover of book. 16 pp. Ill. 8½ x 11 in.

**Truscon Steel Company,** Youngstown, Ohio.

316. *Hy-Rib and Metal Lath.* Tables, general data and illustrations of Hy-rib and metal lath construction. 6 pp. Ill. 8½ x 11 in.

### LAUNDRY EQUIPMENT

**The American Laundry Machinery Co., Advertising Dept.,** Cincinnati, Ohio.

84. *Catalog.* Illustrated. Washing machines, accessories, extractors, clothes tumblers, drying and ironing machines, etc., showing various types and electrical controls with specifications and dimensions for the installation and use of laundry machinery in laundries, institutions, hotels; also for mill and community laundries. Size 12½ x 9½ in. 218 pp.

**Chicago Dryer Co.,** 2210 N. Crawford Ave., Chicago, Ill.

66. *Laundry Appliances.* Illustrated catalog. Descriptions of Laundry Dryers, Electric Washing Machines and Ironing Machines, especially adapted for use in residences, apartment buildings and small institutions. Size 8½ x 11 in. 48 pp.

**The Pfaudler Co.,** Rochester, N. Y.

322. *Pfaudler Chutes for Economy.* Folder showing illustrations, drawings and description of the Pfaudler Laundry Chute giving dimensions for installations. Size 3⅞ x 8⅞ in. 8 pp.

### LIGHTING—See also Electrical Equipment

**Brascolite Company, Division of the St. Louis Brass Mfg. Company,** St. Louis, Mo.

488. *Catalog No. 9.* This catalog supersedes all previous catalogs. Contains descriptions with illustrations of Brascolites, Elites and Industrolites, together with table and diagram for quickly determining wattage and sizes to illuminate a given area. 29 pp. Ill. in colors. 8 x 10½ in.

**I. P. Frink, Inc.,** 24th St. and 10th Ave., New York.

150. *Light Service for Hospitals. Catalogue* 421. A booklet illustrated with photographs and drawings, showing the types of lights for use in hospitals, as operating table reflectors, linolite and multilite concentrators, ward reflectors, bed lights and microscopic reflectors, giving sizes and dimensions, explaining their particular fitness for special uses. Size 7 x 10 in. 12 pp.

218. *Picture Lighting. Booklet* 422. A pamphlet describing Frink Reflectors for lighting pictures, art galleries, decorated ceilings, cove lighting, the lighting of stained glass, etc., and containing a list of private and public galleries using Frink Reflectors. 24 pp. Ill. 5¼ x 7 in.

219. *Frirk Reflectors and Lighting Specialties for Stores. Catalog No.* 424. A catalog containing a description of the Frink Lighting System for Stores; the Synthetic System of Window Illumination; and a number of appliances to produce the most effective lighting of displayed objects. 20 pp. Ill. 8 x 11 in.

220. *Frink Lighting Service for Banks and Insurance Companies. Reflectors. Catalog No.* 425. A very interesting treatise on the lighting of offices; with details of illustrations and description of lamps and reflectors. Contains a list, covering several pages, of banks using Frink Desk and Screen Fixtures. 30 pp. Ill. 8¼ x 11 in.

**Harvey Hubbell, Inc.,** Bridgeport, Conn.

401. *Hubbell Flush Door Receptacles.* Description of a safe, convenient and practical wall outlet de luxe for fine residences, clubs, hotels, public buildings and offices. 4 pp. Ill. 8 x 10 in.

**Lightolier Company,** 569 Broadway, New York, N. Y.

412. *After Sunset Lightoliers.* A beautiful catalog and price list of electric lighting brackets and suspension fixtures. 16 pp. Ill. 8 x 10¼ in.

**National X-Ray Reflector Company,** 235 Jackson Blvd., Chicago, Ill.

465. *How to Know and Have Good Lighting.* A treatise on the development of lighting. Beautifully illustrated photographs and descriptions of lighting installations in every kind of building from a variety of applications including ceiling fixtures, art lamps, floor pedestals, cornices, coves and other special adaptations. It also gives a list of buildings where X-Ray Eye Comfort Lighting has been used. Size 7⅝ x 10 inches. 48 pp.

**The Reflectolyte Co.,** 914 J Pine St., St. Louis, Mo.

244. *"Reflectolyte" Catalog No.* 4. Description, Engineering Data, descriptions and prices of the well known type of reflector and suspended bowl lighting fixtures. 32 pp. Ill. 7¼ x 10¼ in.

**Mitchell Vance Co., Inc.,** 503-511 West 24th St., New York, N. Y.

360. *Catalog No.* 25. A descriptive catalog, with prices, of the "T. R. B." Lighting Unit, for perfect distribution of light without glare and without shadows. 24 pp. Ill. 8 x 10 in.

### LIME

**The Ohio Hydrate & Supply Co.,** Woodville Ohio.

494. *A Job that Took a Million Years.* A description of how limestone is formed and how it is later converted into lime. All the processes are shown in detail and the uses of lime are illustrated. 16 pp. Ill. 8½ x 11 in.

JSC

Johnson Service Company maintains 26 branches on the North American continent: one in each of the twenty largest and geographically best located cities in United States, six likewise in Canada. Each branch is Johnson Service Company; not a sales agent office, dealer or contractor representative: but thoroughly *Johnson*, with every Johnson *Service* intent, purpose and equipment. Although that indicates this company's great size and extent of business, it is mentioned entirely, however, to again emphasize what the word *Service* in this company's name means, and why it is there.

*The Johnson System of Temperature Regulation not only provides an actual saving in the consumption of coal equal to much more than the interest on the cost of the investment, but a constantly uniform temperature, guaranteeing a luxury and comfort immeasurable by money.*

## REFERENCE LIST OF BUSINESS LITERATURE—Continued

### LINOLEUM—See also Flooring

**Armstrong Cork Co., Linoleum Department,** Lancaster, Pa.

223. *Armstrong's Linoleum Floors.* A handbook for architects, published in the file form of (8½ x 11 in.) recommended by the American Institute of Architects. A technical treatise on Linoleum containing general information, tables of grades, gauges and weights, specimen specifications, and detailed directions for laying linoleum. Profusely illustrated in colors.

### LOCKERS, STEEL—See Factory Equipment

### LUMBER

**The Long-Bell Lumber Co.,** R. A. Long Building, Kansas City, Mo.

203. *From Tree to Trade.* This book tells the story of the manufacture of lumber. Gives an idea of the scope of the business and the care and attention given to the manufacture and grading of Long-Bell trade-marked products. 100 illustrations. 48 pp. 8½ x 11 in.

**The Pacific Lumber Company of Illinois,** 2060 McCorMick Bldg., Chicago, Ill.

303. *Construction Digest*— The use of California Redwood in residential and industrial construction. Contains illustrations, grading rules, specifications and other technical data for architects and builders. 16 pp. Ill. 8½ x 11 in.

304. *Engineering Digest*— The use of California Redwood in industrial construction and equipment for factories, railroads, mines and engineering projects. 16 pp. Ill. 8½ x 11 in.

### LUMBER, ASBESTOS

**Asbestos Shingle, Slate & Sheathing Co.,** Ambler, Pa.

54. *Ambler Asbestos Building Lumber.* Catalog illustrated. Describes uses of this fireproof product for both exteriors and interiors. Tables of sizes and illustrations of various types of buildings in which it has been used. Size 8½ x 11 in. 32 pp.

### MANTELS

**Edwin A. Jackson & Bro., Inc.,** 50 Beekman St., New York.

90. *Wood Mantels.* Portfolio. Woodmantel designs of various types and openings, giving dimensions, projections and showing fireplace grate designs. Size 9 x 6¼ in. 32 pp.

### MEMORIALS

**Harrison Granite Co.,** 200 Fifth Ave., New York.

151. *Memorials.* Booklet showing photographic illustrations and text of monumental pieces and memorials, of granite, ranging from monuments of public interest to simple private tributes. Size 4 x 9 in. 24 pp.

### METALS—See also Iron and Steel

**American Brass Co.,** Main Office, Waterbury, Conn.

138. *Price List and Data Book.* Illustrated. Loose-leaf Catalog. Covers entire line of Sheets, Wire Rods, Tubes, etc., in various metals. Useful tables. Size 3⅞ x 7 in. 168 pp.

139. *Illustrated Pamphlets.* Describes the use and adaptability of Extruded Architectural Shapes, Benedict Nickel, Brass and Copper Pipe in Iron Pipe sizes for plumbing installations. 8½ x 11 in.

385. *Copper Products.* Illustrated price list and tables of weights. Covers copper for roofing purposes, including strip copper for forming into leaders, gutters, valleys, flashings, etc. 64 pp.

**American Sheet & Tin Plate Co.,** Frick Building, Pittsburgh, Pa.

452. *Reference Book. Pocket Edition.* Covers the complete line of Sheet and Tin Mill Products. 168 pp. Ill. 2½ x 4½ in.

**Bridgeport Brass Co.,** Bridgeport, Conn.

483. *Seven Centuries of Brass Making.* A brief history of the ancient art of brass making and its early (and even recent) method of production—contrasted with that of the Electric Furnace Process—covering tubular, rod and ornamental shapes. 80 pp. Ill. 8 x 10½ in.

**Copper & Brass Research Association,** 25 Broadway, New York, N. Y.

466. *How to Build a Better Home.* A book on building written for the prospective builder. It contains keyed illustrations of houses and details of houses and should be of value to architects in explaining technical terms to clients. 30 pp. Ill. 7¼ x 10½ in.

**Rome Brass & Copper Company,** Rome, N. Y.

473. *Price List No.* 70. A loose-leaf binder containing full price list of Rome Quality products, together with useful tables. 5⅛ x 7¼ in.

### MILLWORK—See also Lumber—Building Construction—Doors and Windows

### MOLDINGS, METAL

**National Metal Molding Co.,** 25 Fulton Bldg., Pittsburgh, Pa.

85. *Bulletins.* Bound in a standard correspondence folder suitably indexed for convenient filing, describes complete line of metal moldings.

**National Metal Molding Co.,** 25 Fulton Bldg., Pittsburgh, Pa.

152. *Hand-book for the Man on the Job.* An Illustrated book of fittings and methods with description and instructions for installing National Metal Molding under all conditions; a book meant to be conveniently carried and used on the job. Size 4⅜ x 6 in. 102 pp.

### MORTAR—See also Cement

**Louisville Cement Company, Inc.,** Louisville, Ky.

311. *Brixment, the Perfect Mortar.* The reading of this little book gives one a feeling that definite valuable information has been acquired about one of the oldest building materials. Modern science has given the mason a strong water-resisting mortar with the desirable "feel" of the best rich lime mortar. 16 pp. Ill. in colors. 5½ x 7¾ in.

### OIL STORAGE SYSTEMS

**Wayne Oil Tank and Pump Company,** Fort Wayne, Ind.

F544. *Bulletins on Oil Storage.* A collection of illustrated bulletins bound in loose leaf binder of tough paper, showing details of installation of oil storage systems for all purposes. 8½ x 11 in.

### ORNAMENT METAL WORK—See also Architectural Iron Work—Metals

**Newman Manufacturing Company,** 416 Elm St., Cincinnati, Ohio.

229. *Newman Ornamental Metal Work—Catalog A.* Booklet showing installations of brass and bronze railings, door hardware, grille work, etc., in banks, theatres and other public buildings. Also shows lighting fixtures and special metal work of all descriptions. 64 pp. Ill. 8 x 11 in.

### PAINTS, STAINS, VARNISHES—See also Waterproofing

**The Arco Company,** Cleveland, Ohio.

F538. *Arco Specifications.* A collection of 27 specifications for plastic, compounds, damp proofings, technical finishes, white industrial finishes, enamels, concrete hardeners, preservative steel coatings, architectural varnishes. 102 pp. in loose leaf binder. 8½ x 11 in.

**Breinig Brothers, Inc.,** Third and Grand Sts., Hoboken, N. J.

210. *Color Cards;* contains suggestions for color combinations and painting in general; with descriptions for use and illustrations of the following paints; house paint, metal protective paint, shingle stain, enamel tints, floor and deck paint, "Wallsheen" (flat wall paint), barn and silo paint, screen paint.

211. *Cartons;* contains panels illustrating various effects obtained on woods by the use of Breinig Brothers Wood Finishes.

**Carter White Lead Co.,** 12,042 South Peoria St., Chicago, Ill.

270. *The Carter Paint Calculator.* A valuable book containing answers and solutions to common paint problems; gives sample estimates; data useful to both architect and master painter. Black Fabrikoid cover. Vest pocket size 2½ x 4½ in. 70 pp. Sent postpaid anywhere on request.

**Joseph Dixon Crucible Co.,** Jersey City, N. J.

324. *Dixon's Silica-Graphite Paint.* A pamphlet describing the physical properties of silica-graphite paint and especially the wide difference between it and other protective paints. Contains also sample color card with specifications. 20 pp. and 6 pp. in color card. Ill. 3¼ x 6¼ in.

**Samuel H. French & Co., Philadelphia, Pa.**

312. *French's Paints and Varnishes.* A catalog and price list of paints, stains, varnishes, mortar colors, cement colors and materials for plasterers, with instructions for selection of colors, etc. 44 pp. Ill. 4 x 8 in.

**A. C. Horn Company,** New York, N. Y.

300. *Color Card and Brief Description of various Horn Painting Specialties.* Koncrex, Protective Floor coating; Aclac, Service Paint; Symentrin, Flat Wall Finish; Symentrex (Liquid Concrete), a Complete Finish for Concrete or Brick; Horns House Paints (Gov't Specification).

**The New Jersey Zinc Co.,** 160 Front St., New York, N. Y.

227. *Painting Specifications.* A booklet full of useful information concerning paint mixtures for application on various surfaces.

**Parker, Preston & Co., Inc.,** Norwich, Conn.

357. *Art in Shingle Stains.* Description of waterproof, odorless shingle stains and waterproof coatings for walls and floors; with covering capacities and directions for use. 27 pp. 3 x 4½ in.

**Ripolin Co., The,** Cleveland, Ohio.

419. *Ripolin Specification Book,* 8 x 10¼ in., 12 pp. Complete architectural specifications and general instructions for the application of Ripolin, the original Holland Enamel Paint. Directions for the proper finishing of wood, metal, plaster, concrete, brick and other surfaces, both interior and exterior, are included in this Specification Book.

**The Sherwin-Williams Co.,** 601 Canal Road, Cleveland, Ohio.

278. *Painting and Varnishing Specifications.* A complete specification text book on the painting and finishing of architectural surfaces. 30 pp. 8½ x 11 in.

279. *Portfolio of Flat-Tone Multi-Color Effects.* Containing samples and complete specifications for securing the latest and most beautiful effects in interior wall decoration. 2¼ x 6 in.

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## REFERENCE LIST OF BUSINESS LITERATURE—Continued

### PILES, CONCRETE

**Raymond Concrete Pile Co.,** 140 Cedar St., New York.
**156.** *Raymond Concrete Piles—Special Concrete Work.* A booklet with data concerning the scope of the Raymond Concrete Pile Co., for special concrete work. It classifies piles, showing by illustration, text and drawings, the relative value of special shape and manufacture of piles. It gives formulæ for working loads, and relative economy. Size 8½ x 11⅛ in. 60 pp.

**MacArthur Concrete Pile and Foundation Co.,** 12 John St., New York, N. Y.
**323.** *Concrete Pile Standards.* This treatise gives standard details for pile caps with standard specifications for concrete piles and has a valuable chapter entitled, "How a Pile Supports Its Load." Useful tables are presented with worked examples of computations for typical and unusual conditions. 64 pp. Ill. 9 x 12 in.

### PIPE—See also Metals

**The Duriron Company,** Dayton, Ohio.
**256.** *Acid Proof Drain Pipe and Sanitary Fittings. A Message to Owner, Architect and Sanitary Engineer. Bulletin* 126. This bulletin explains the advantages of Duriron Pipe to resist the corrosive action of acids and alkalis. Contains drawings, tables of dimensions and full instructions for installation. 6 pp. Ill. 8 x 10½ in.

**National Tube Co.,** Frick Bldg., Pittsburgh, Pa.
**437.** *National Bulletin No.* 25. This bulletin is a valuable treatise on corrosion in pipes; flow of water; flow of steam; strength of pipes of various sizes when used as beams and as columns, etc., numerous tables and diagrams. 86 pp. Profusely illustrated. 8½ x 11 in.

**A. Wyckoff & Son Co.,** Elmira, N. Y.
**397.** *Wyckoff Wood Pipe. Catalog No.* 42. A description of machine-made woodstave pipe and Wycoff's cypress steam pipe casing. Contains also a number of pages of useful formulas and tables for hydraulic computations. 92 pp. Ill. 6 x 9 in.

### PIPE COVERING

**The Philip Carey Co.,** Lockland, Cincinnati, Ohio.
**379.** *Pipe and Boiler Coverings. Catalog* 1362. A catalog and manual of pipe and boiler coverings, cements, etc. Contains a number of valuable diagrams and tables. 71 pp. Ill. 6 x 9 in.

### PLASTER BASE—See also Stucco Base

### PLUMBING EQUIPMENT—See also Drains

**A. P. W. Paper Co.,** Albany, N. Y.
**326.** *Toilet Cabinets.* A specification card for letter file containing complete descriptions with dimensions, capacity, etc., of Onliwon Cabinets for toilet paper. Illustrated.

**Bridgeport Brass Co.,** Bridgeport, Conn.
**461.** *Plumbing Supplies.* Catalog of adjustable swivel traps; basin and bath supplies and wastes; basin and sink plugs; low tank bends; iron pipe sizes of brass pipe. 20 pp. Ill. 8 x 10½ in.

**C. F. Church Manufacturing Company,** 430 Williams St., Holyoke, Mass.
**430.** *"White Pyralin" Catalog W. S.* A catalog of White Pyralin closet seats. They are made of the best material and covered with Pyralin, a pure white substance which is applied in sheet form and should not be confused with sprayed or enameled products. The surface is non-porous; can be washed with soap and water; does not turn yellow and is guaranteed not to crack or chip. 24 pp. Ill. 6 x 9 in.

**Crane Company,** 836 So. Michigan Ave., Chicago, Ill.
**240.** *General Plumbing Catalogue.* A very complete and well illustrated booklet describing the complete line of Crane plumbing goods. 800 pp. Ill. 8½ x 11 in.

**The Imperial Brass Co.,** 1200 W. Harrison St., Chicago, Ill.
**95.** *Catalog C.* Loose-leaf catalog. Illustrated. Describes Watrous equipment; drinking fountains, lavatories, sinks, flushing valves, urinals, seats and all other necessary equipment of the best types of plumbing fixtures. Size 8½ x 10¾ in. 62 pp.
**98.** *Watrous Gravity Liquid Soap System.* Loose-leaf Catalog. Giving photographs of all details of equipment with description of their use. Size 8½ x 10¾ in. 5 pp.

**The Frost Manufacturing Company,** Kenosha, Wis.
**F539.** *Catalog E.* A complete catalog of plumbers' brass goods. Many pieces are illustrated by placing a half-tone on the left hand page and a line drawing on the right and facing page. 288 pp. Ill. 6 x 9¼ in. Cloth Bound.

**Jenkins Bros.,** 80 White St., New York, N. Y.
**236.** *Jenkins Valves for Plumbing Service.* This booklet contains all necessary information about Jenkins Valves commonly used in plumbing work. 16 pp. Ill. 4¼ x 7¼ in. Stiff paper cover.

**Kohler Company,** Kohler, Wisconsin.
**209.** *"Kohler of Kohler."* A booklet on enameled plumbing ware describing processes of manufacture and cataloging staple baths, lavatories, kitchen sinks, slop sinks, laundry trays, closet combinations. 48 pp. Ill. 5⅛ x 8 in. Roughing-in Measurement Sheets 5 x 8 in.

**Thomas Maddock's Sons,** Trenton, N. J.
**259.** *General Catalog.* Contains complete description of the full line of fixtures styled the "Highest Grade Standardized Plumbing Fixtures for Every Need." 94 pp. Ill. 5 x 7½ in.
**260.** *Specifications for Plumbing Fixtures.* Contains tables of specifications for industrial buildings, schools, apartments, hotels, etc. 8 pp. Ill. 9 x 12 in.

**The Vulcan Brass Manufacturing Co.,** Cleveland, Ohio.
**214.** *Paragon Ball Bearing Self Closing Faucets, Bibbs and Stops—Catalog B.* Illustrated book, showing sectional drawings, illustrations and text describing "Paragon" self-closing work, high pressure ball cocks, parts and valves.

**Wheeling Sanitary Manufacturing Co.,** Wheeling, W. Va.
**388.** *Complete Catalog "E."* Describes all clay Sanitary Baths, Lavatories, Kitchen Sinks, Laundry Trays, Drinking Fountains and Urinal Stalls of Semi-vitreous Porcelain ware; also Closet Bowls, Flush Tanks, Lavatories, Basins, Urinals and Drinking Fountains of White Vitreous Chinaware. 125 pp. Ill. 5 x 8 in.

**Wheeling Sanitary Manufacturing Co.,** Wheeling, W. Va.
**398.** *Combination Bath.* A circular describing a new form of bath which combines a seat bath, foot bath, shower bath and child's bath. Occupies much less space than the ordinary bath tub. 12 pp. Ill. 3½ x 6¼ in.

### POTTERY AND FINE TILE

**The Rookwood Pottery Company,** Cincinnati, Ohio.
**410.** *Rookwood, Cincinnati.* A booklet dealing in a general way with the various products of this well known company. It is illustrated and contains 8 pages, 6x9 in. The company issues many small booklets, each one dealing with a special product.

### PUMPS

**The Dayton Pump and Manufacturing Company,** Dayton, Ohio.
**475.** *Electric House Pumps ond Water Supply Systems.* A heavy paper binder containing illustrated bulletins 8½ x 11 in. These bulletins describe pumps as well as complete automatic electric and gasoline water supply systems and all accessories, together with specifications, detail drawings and tables of dimensions. 48 pp.

**The Duro Pump and Manufacturing Co.,** Dayton, Ohio.
**F541.** *Catolog No.* 4. A catalog of water supply systems for city, suburban or farm homes. 32 pp. Ill. 8 x 11 in.

### REFRIGERATION

**The Automatic Refrigerating Co.,** Hartford, Conn.
**298.** *The Mechanics of Automatic Refrigeration* and *Automatic Refrigeration for Hospitals and Sanatoriums.* Two essential booklets for the library of designers and specification writers. 24 and 28 pp. Ill. 8½ x 11 in.
**370.** *Automatic Refrigeration for Retail Markets.* A valuable treatise on the subject matter mentioned in the title. 30 pp. Ill. 8½ x 11 in.

**The Jewett Refrigerator Company,** 27 Chandler Street, Buffalo, N. Y.
**231.** *Refrigeration and Health. Vital Facts You Ought to Know.* A booklet outlining the basic requirements of a good refrigerator and explaining how to use a refrigerator to secure best results 16 pp. Ill. 4¾ x 7¾ in.

### REFRIGERATORS

**McCray Refrigerator Co.,** Kendallville, Ind.
**472.** *Refrigerators and Cooling Rooms, Cat.* 53. A catalog of cooling equipment for hotels, restaurants, hospitals, institutions, colleges and clubs. Catalog No. 96 deals with refrigerators for residences. 52 pp. each. Ill. in colors. 7½ x 10 in.

**Herrick Refrigerator & Cold Storage Co.,** Waterloo, Iowa.
**F537.** *Herrick, The Aristocrat of Refrigerotors.* An illustrated description of refrigerators for all purposes. Contains also dimensioned blue prints to aid architects in planning the installation of refrigerators iced from the outside. 63 pp. Ill. 6¾ x 10 in.

### ROOFING—See also Slate—Metals—Shingles

**American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa.**
**463.** *Copper—Its Effect Upon Steel for Roofing Tin.* Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy. 28 pp. Ill. 8½ x 11 in.

**Asbestos Shingle, Slate & Sheathing Co.,** Ambler, Pa.
**53.** *Ambler Asbestos Corrugated Roofing.* Catalog gives complete data for specifying, drawings, methods of application, tables, etc. Size 8½ x 11 in. 20 pp.

**The Barber Asphalt Paving Company, Land Title Bldg.,** Philadelphia, Pa.
**422.** *Standard Trinidad Built-Up Roofing Specifications.* Contains two specifications for applying a built-up roof over boards and two for applying over concrete. Gives quantities of materals and useful data. 8 pp. 8 x 10½ in. Ask at same time for Good Roof Guide Book. 32 pp. Ill. 6 x 9 in.

**The Barrett Company,** 40 Rector St., New York, N. Y.
**403.** *Roof Flashings Hondbook.* A complete descriptive account, illustrated with photographs and architectural blue print drawings, of the new Barrett Standard Roof Flashings. The various types are shown with specifications for their installation. 50 pp. Ill. 6 x 9 in.
**404.** *Architectural Service Sheets.* Sheets containing valuable data and information for architects, each dealing with the following products separately: Holy Roof Connection; Barrett Roof Flashings; Barrett Specification Roofs. Full specifications given in each case. Illustrated with photographs and architectural drawings. 16½ x 22½ in.

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IT'S the stuff underneath the slate that makes the shingle non-curling and lasting.

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## REFERENCE LIST OF BUSINESS LITERATURE—Continued

### ROOFING—See also Slate—Metals—Shingles

**John Boyle & Co., Inc.,** 112-114 Duane St., New York, N. Y.

**212.** *Boyle's Bayonne Roof and Deck Cloth.* List B 93. A prepared roofing canvas guaranteed waterproof for decks and the roofs and floors of piazzas, sun-parlors, sleeping porches, etc.

**The Philip Carey Co.,** Lockland, Cincinnati, Ohio.

**378.** *Architects' Specification Book on Built-up Roofing.* A manual for detailers and specification writers. Contains complete details and specifications for each type of Carey Asphalt Built-up Roof. 20 pp. Ill. 8½ x 11 in.

**The Copper and Brass Research Association,** 25 Broadway, New York, N. Y.

**468.** *Copper Roofing.* Weights of various roofing materials. Up-to-date practice in the laying of copper roofs—Batten or wood rib method, Standing seam method, Flat copper roofs, Copper shingles, Suggestions for avoiding error and obtaining the full value of copper, Decorative effects and how to obtain them. Flashings, reglets, gutters and leaders. Cornices. Copper-covered walls. Specifications. 32 pp. Ill. 8½ x 11 in.

**The John D. Emack Co.,** 112 So. 16th St., Philadelphia, Pa.

**251.** *Old Stonefield Roofs.* An envelope portfolio containing two plates in color and 20 views of houses having Stonesfield roofs. The accompanying 8 pages of text describe the manufacture and laying of Old Stonesfield slate roofs 5½ x 6⅜ in.

**Ludowici-Celadon Co.,** Chicago, Ill.

**154.** *The Roof Beautiful.* Booklet. Well illustrated with photographs and drawings, giving history and origin of roofing tile, and advantages over other forms of roofing. Types shown by detailed illustrations. Size 8 x 10¼ in. 32 pp.

**The Richardson Company,** Lockland, Cincinnati, Ohio.

**492.** *Viskalt Membrane Roofs.* Contains specifications for applying Membrane roof over boards and also for applying over concrete. Illustrated with line drawings of several approved methods of flashings. 3 pp. 8½ x 11 in.

**Rising and Nelson Slate Company,** 101 Park Ave., New York, N. Y.

**496.** *Tudor Stone Roofs.* This leaflet discusses colors and sizes of Tudor hand-wrought slates; deals with the service given to architects and tells how the material is quarried for each product after careful drawings and specifications are prepared in co-operation with architects. Special grades are described in detail and illustrations are given of buildings with Tudor slate roofs. Contains also specifications for laying slate. 4 pp. Ill. 8½ x 11 in.

**Porete Mfg. Co.,** 26 Verona Ave., Newark, N. J.

**258.** *Porete Roof-decks.* An illustrated circular describing Porete (a new light-weight concrete) for use in fireproof roofs for all buildings. 4 pp.

**Vendor Slate Co.,** Easton, Pa.

**333.** Occasional brochures on architecturally pertinent phases of roofing slate sent on request. See also listing under Slate.

### ROOF-LIGHTS—See Glass Constructions

### SCREENS

**American Wire Fabrics Company,** 208 So. La Salle St., Chicago, Illinois.

**305.** *Catalog of Screen Wire Cloth.* A catalog and price list of screen wire cloth, black enamelled, galvanized, aluminoid, copper bronze. 30 pp. Ill. 3½ x 6¼ in.

**The Higgin Manufacturing Co.,** 5th and Washington Ave., Newport, Ky.

**353.** *Screen your Home in the Higgin Way.* A description of Higgin door and window screens with practical data. 16 pp. Ill. 8½ x 11½ in.

**The New Jersey Wire Cloth Company,** 614 South Broad St., Trenton, N. J.

**409.** *A Matter of Health and Comfort. Booklet No. #331.* A booklet telling all about screens, the durability of copper and its superiority over all other metals for screen purposes. 16 pp. Ill. 5x7¼ in.

### SHEATHING—See also Stucco Base

### SHINGLES—See also Roofing

**Illinois Zinc Company,** 280 Broadway, New York, N. Y.

**417.** *The Roof That's Always New.* A description of pre-oxidized zinc shingles. They have the shape of wooden butt-shingles and a handsome weather gray color so they are as beautiful and artistic as wooden shingles. 11 pp. Ill. 3½ x 6 in.

**The Philip Carey Co.,** Lockland, Cincinnati, Ohio.

**381.** *Carey Asfaltslate Shingles.* Folder containing illustrations of attractive buildings and residences on which Carey Asfaltslate Shingles have been used. Describes this type of shingle, showing its special claims and advantages.

### SIDEWALK LIGHTS—See also Vault Lights

### SKYLIGHTS—See also Glass Constructions—Vault Lights

**H. H. Robertson Company,** 1st National Bank Bldg., Pittsburgh, Pa.

**87.** *Robertson Glazing Construction.* Booklet, illustrated. Types of construction used in industrial, commercial and educational buildings, residences and hospitals, giving description, diagrams, tables of sizes and details of construction. Size 8 x 10½ in. 40 pp.

### SLATE—See also Roofing

**Vendor Slate Co., Inc.,** Easton, Pa.

**332.** *The Vendor Book of Roofing Slate for Architects.* Contains original information on slate in various architectural uses; history, geology, sundry practical matters; complete descriptive classification; extended treatise on architectural roof design and specifications. 24 pp. Ill. 8½ x 11 in.

### STAINS—See also Paints, Stains, Varnishes

### STONE

**Indiana Limestone Quarrymen's Assn.,** P. O. Box 503, Bedford, Indiana.

**37.** *Indiana Limestone.* Illustrated booklet, Vol. 1, of the Limestone Library. Size 6 x 9 in. 36 pp.

**147.** *Designs for Houses of Indiana Limestone.* A booklet of the best designs submitted in a competition for a detached residence faced with Indiana Limestone. Size 8½ x 11 in. 32 pp.

**265.** *Folders: Series D.* Structural detail and data sheets showing methods of detailing cut stone work in connection with modern building construction. 4 pp. each. 8½ x 11 in.

**366.** *Standard Specifications for Cut Stone Work.* This is Vol. III, Series "A-3," Service publications on Indiana Limestone, containing Specifications and Supplementary Data, relating to best methods of specifying and using this stone for all building purposes. This valuable work is not for general distribution. It can be obtained only from a Field Representative of the Association or through direct request from architect written on his letter head. 56 pp. Ill. 8½ x 11 in.

**National Building Granite Quarries Asso., Inc.,** 31 State Street, Boston, Mass.

**416.** *Architectural Granite No. I of the Granite Series.* This booklet contains descriptions of various granites used for building purposes; surface finishes and how obtained; profiles of moldings and how to estimate cost; typical details; complete specifications and 19 plates in colors of granite from various quarries. 16 pp. Ill. 8½ x 11 in.

**The Vermont Marble Company,** Proctor, Vt.

**491.** *The Book of Vermont Marble.* A reference book for the architectural profession. Accompanied by portfolio of colored plates of marble samples. 67 pp. Ill. 8¼ x 11 in.

### STORE FRONTS

**Brasco Mfg. Co.,** Chicago Ill.

**56.** *Brasco System of Hollow Metal Store Front Design.* Folio of Detail Sheets. Full size detail sheets 1, 2, 3 and 4. Corner bar, division bar, reverse bar and three way bar, head transom, sill and jamb sections. Sheets 18 x 22½ in.

**57.** *Hester System Store Front Construction and Design.* Folio of Details Sheets. Full size detail sheets, a, b, c and d, of hollow metal store front construction, giving full size sections of head, transom, sill and jamb with moulding profiles and bar cover to house awning construction. Sheets 18 x 22½ in.

**Detroit Show Case Co.,** Detroit, Mich.

**77.** *Designs.* A booklet. Store fronts and display window designs, giving plans and elevations, and descriptions. Size 9¼ x 12 in. 16 pp.

**78.** *Details.* Sheets of full size details of "Desco" awning transom bar covers, sill covers, side, head and jamb covers, ventilated hollow metal sash and profile of members. Size 16 x 21½ in. 3 sheets.

**The Kawneer Company,** Niles, Mich.

**467.** *A Collection of Successful Store Front Designs.* Illustrations of recently erected modern store fronts with all framing covered with solid copper. Maximum show window surface secured by these designs. Many classes of occupancy shown. 64 pp. Ill. 6¾ x 9¼ in.

**Zouri Drawn Metals Co.,** Chicago Heights, Ill.

**407.** *Architects' Catalog.* In addition to general descriptive matter this catalog contains a true copy of the approval of the Underwriter's Laboratories and a proper glazing specification, based on the Underwriter's report. 88 pp. Ill. 8¼x 11¼ in.

### STOVES

**George M. Clark & Co., Division of American Stove Co.,** 179 No. Michigan Ave., Chicago, Ill.

**458.** *Gas Stove Catalog, No.* 114. A complete catalog of Clark Jewell gas stoves; water heaters; room heaters; ovens; waffle irons; cake bakers; hot plates; etc. 76 pp. Ill. 6 x 9 in.

**Dangler Stove Co., Division of American Stove Co.,** Cleveland, Ohio.

**459.** *Measured Heat Cookery, Catalog No.* 161. A catalog of gas cooking stoves, ranges and water heaters; featuring the Lorain Oven Heat Regulator, a device for obtaining uniform heat without constant supervision. 72 pp. Ill. 7½ x 10¾ in.

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H. H. Sherman, Secretary

GRANITE

# REFERENCE LIST OF BUSINESS LITERATURE—Continued

**STUCCO BASE**

**The Bishopric Manufacturing Company,** Cincinnati, Ohio.

451. *Bishopric for All Time and Clime.* A booklet describing Bishopric materials; giving building data, detail drawings and specifications. Illustrated with half tones from photographs of houses built of Bishopric materials. 52 pp. Ill. 8 x 10½ in.

**STUCCO—See also Cement**

**The Atlas Portland Cement Co.,** 25 Broadway, New York, N. Y.

280. *The Stucco House.* Contains many beautiful illustrations of houses finished with stucco and selected particularly for their architectural value. Detailed illustrations of stucco surface textures and drawings showing wall construction with revised specifications covering application of stucco. 96 pp. 8½ x 11 in. Price 50 cents.

**National Kellastone Company,** 155 East Superior St., Chicago, Ill.

302. *Specifications for Stucco Work.* A booklet containing complete specifications in detail for the use of Kellastone stucco for new buildings as well as the "overcoating" of old buildings. 13 sheets of text, 2 sheets of illustrations. 8 x 11 in.

303. *The Story of Kellastone Imperishable Stucco.* In this most interesting book the merits of Kellastone are set forth in a convincing manner. Every page contains pictures of beautiful houses stuccoed with Kellastone and there are two pages in color. 22 pp. Ill. 8½ x 12 in.

**TELEPHONES**

**Federal Telephone & Telegraph Co.,** Buffalo, N. Y.

344. *Federal Apartment House Telephones.* A short illustrated description of four classes of telephone equipment for apartment houses; Vestibules, the Suites, Rear Entrance, and the Janitor's Headquarters. 6 pp. Ill. in colors. 4 x 8 in.

345. *Interior Telephone Systems. Bulletin No. 610.* A detailed description of Selective Talking and Ringing Systems and Multiple Talking Systems of telephones for all kinds of establishments, from the most simple to those working on exchange trunks and central stations. 22 pp. Ill. 8¼ x 10 in.

**TERRA COTTA**

**Atlantic Terra Cotta Company,** 350 Madison Ave., New York, N. Y.

425. *Questions Answered.* A brief but full description of Atlantic Terra Cotta and its use in buildings. 32 pp. Ill. 5½ x 7 in.

426. *Booklets on Buildings.* A series of booklets describing terra cotta work for buildings of different kinds. In applying, mention size, type and purpose of building for which data is wanted.

**National Terra Cotta Society,** One Madison Ave., New York, N. Y.

157. *Terra Cotta Defined. Brochure Series, Vol. VI.* Illustrated brochure with photographic illustrations of architectural terra cotta, details of terra cotta ornament in office-buildings, theatre, bank, school, store, and public building. Its adaptability and lasting qualities are given and the process of manufacture and history is briefly outlined. Size 8½ x 11 in. 32 pp.

445 *Present Day Schools. .Brochure Series. Vol. I.* The use of terra cotta for schools is exemplified in the presentation of 42 schools in the East, the Middle West and Far West, together with a discussion of "Some General Points on School Buildings" by James O. Betelle, A. I. A. 32 pp. Ill. 8½ x 11 in.

446. *Better Banks. Brochure Series. Vol. IV.* Illustrations are given of handsome appearing banks in many states, showing the application of terra cotta, with an article on "Terra Cotta for Banks" by Alfred C. Bossom, architect. 32 pp. Ill. 8½ x 11 in.

**The Northwestern Terra Cotta Co.,** 2525 Clybourn Ave., Chicago, Ill.

90. *Architectural Terra Cotta.* A collected set of advertisements in a book, giving examples of architectural terra cotta, ornamental designs and illustrations of examples of facades, of moving picture houses, office buildings, shops, vestibules and corridors in which Northwestern Terra Cotta was used. Size 8½ x 11 in. 78 pp.

**TILE—Ornamental**

**The Associated Tile Manufacturers,** Beaver Falls, Pa.

250. *Basic Information on Tiles.* Book giving practical information on ingredients. processes, gradings, sizes, shapes, colors, finishes and nomenclature. Sent to architects on request. 7½ x 10⅝ in.

358. *Home Suggestions.* A new book in colors describing and illustrating the use of tiles in floors, walls, ceilings, fireplaces, garages, for exterior embellishment, etc. Full of suggestions. Sent to architects on request. 7½ x 10⅝ in.

374. *Basic Specifications for Tilework and Related Documents. No. K-300.* This specification is prepared in a very systematic manner for the use of architects and builders. It is printed on one side of a sheet with facing page blank to receive memoranda. Various colored sheets make reference easy and simplify greatly the work of a specification writer in specifying tilework. 38 pp. 7½ x 10⅝ in.

375. *"Work Sheets" for Specification Writers.* To be used in connection with "Basic Specification for Tilework and Related Documents." 16 sheets 7½ x 10⅝ in.

**The National Tile Company,** Anderson, Ind.

F535. *Ceramic Mosaic Catalogs.* Catalog No. 11 contains 29 plates, 5⅜ x 8½ in. and Catalog No. 12 contains 36 plates, 9 x 12 in., in colors, showing designs for mosaic floors and walls.

**TIME CLOCKS—See Clocks**

**TREADS, SAFETY**

**American Abrasive Metals Co.,** 50 Church St., New York, N. Y.

383. *A New Safety Tread.* A folder announcing the perfecting of a process whereby aluminum is used as the abrasive-holding base, or matrix, in a new safety tread for locations where this detail may be ornamental. Ill. 8½ x 11 in.

**TRIM—See also Doors and Windows**

**TRUSSES—See Building Construction**

**VACUUM CLEANERS**

**Landers, Frary & Clark,** Connersville, Ind.

299. *General Catalogue.* This book describes and illustrates Connersville vacuum cleaners, stationary and portable, dry and centrifugal separating units, sizes of machines, uses and typical installations. 24 pp. Ill. 5¾ x 9 in.

**VARNISH—See Paints**

**VAULT LIGHTS**

**American Three Way Luxfer Prism Co.,** 13th Street and 55th Court, Chicago, Ill.

424. *Daylighting. Catalog 21.* A complete catalog on glass prisms for use in transoms, sidewalk and floor lights, skylights, etc., for lighting places inaccessible to direct daylight. Contains also measurements, specifications and other data required by designers. 42 pp. Ill. 8½ x 11 in.

**VENTILATORS**

**The Burt Manufacturing Co.,** Akron, Ohio.

207. *General Catalogue* covering entire line of Ventilators, Exhaust Heads and Filters. Separate leaflets on each type of ventilator, vent and damper.

**Merchant & Evans Co.,** Philadelphia, Pa.

F520. *Health and Ventilation and Star Ventilators.* A discussion of natural ventilation with data on how to determine sizes and number of ventilators required. Gives detail drawing with dimensions of Star Ventilators. 20 pp. Ill. 4 x 9 in.

**VENTILATION—See Heating and Ventilation**

**WALL COVERING**

**Standard Textile Products Co.,** 320 Broadway, New York, N. Y.

111. *Sanitas, Modern Wall Covering.* Folio. Plates of color renderings of various interiors, with suggestions for the library, living room, dining room, boudoir, kitchen and church wall covering, using Sanitas. Size 11½ x 6 in. 15 plates.

112. *Sanitas and Its Uses.* Booklet. Text and color illustrations of Sanitas as a wall covering, with tables for wall and ceiling measurements. Notes on sanitary character, cleanliness and durability of Sanitas. Size 5 x 7 in. 28 pp. 6 color plates and 2 sample sheets.

113. *Sanalining Sanitas Lining and Prepared Lining.* Folder. Notes on durability and cleanly character of the above three products. Size 3¾ x 6 in.

114. *Hints to Decorators.* Booklet. Instructions and specifications for the application of Sanitas, with notes on finishes and material. Size 5 x 6¾ in. 20 pp.

**WALL FINISH**

**Keystone Varnish Company,** Brooklyn, N. Y.

F553. *Keystone Flat Finish.* A book on a wall finish that goes on like paint, looks like wall paper and can be washed. Contains two pages of color samples and several interior views of rooms tinted with Keystonia. 16 pp. Ill. 6 x 9 in.

**WATER HEATERS**

**Humphrey Co.,** Kalamazoo, Mich.

50. *Humphrey Gas Water Heaters.* Catalog and handbook. Diagrams, tables and complete data for specifying gas water heaters of all types and sizes. Size 6 x 9 in. 36 pp.

**Ruud Manufacturing Co.,** Pittsburgh, Pa.

F557. *Ruud Water Heaters.* A collection of five bulletins describing automatic heaters and hot water storage systems. Bound in tough paper folder for vertical file. 22 pp. Ill. 8½ x 11 in.

**WATERPROOFING—See also Dampproofing**

**Samuel Cabot, Inc.,** 141 Milk St., Boston, Mass.

340. *Cabot's Waterproofing Specialties.* Describes Dampproofing, Clear Brick Waterproofing and Clear Cement Waterproofing with specifications and covering data. 12 pp. Ill. 4 x 9 in.

**A. C. Horn Company,** Horn Building, Long Island City, N. Y.

301. *Architect's Set.* A file folder, ready labelled for inclusion in the files, containing a full set of literature on all Horn Waterproofings, Dampproofing and Technical Paints. Descriptive Chart giving covering capacities, etc., printed on inside of folder.

Adding Charm to Dignity

Colored Atlantic Terra Cotta has a place in architecture peculiarly its own when used to enliven a facade of massive stone.

For the University of Texas Library at Austin, Mr. Cass Gilbert used stone in a severely plain design contrasted with brightly colored and delicately modeled window decoration and roundels of Atlantic Terra Cotta.

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350 Madison Avenue, New York

District Manager,
A. P. Clark,
Dallas, Texas

## REFERENCE LIST OF BUSINESS LITERATURE—Continued

### WATERPROOFING

**The Hydrex Asphalt Products Corp.,** 120 Liberty Street, New York.

**62.** *Dampproofing Walls, Above and Below Grade.* Illustrated booklet. Uses and specifications of Hydrex Paint, Hydrex (Bitumen). Compound and Hydrex Waterproof Primer for

**The Truscon Laboratories,** 1632 Caniff St., Detroit, Mich.

**238.** *Architects' Specification Hand Book.* This book contains 32 sheets bound in tough paper loose-leaf binder. The specifications cover the waterproofing of concrete, plaster and stucco; the dampproofing of surfaces of cement, concrete, brick and stone; the oil proofing of concrete; the use of paint and enamel on all surfaces; the application of metallic and chemical floor hardeners; the use of protective steel coatings and architectural varnishes. 8½ x 11 in.

**239.** *Dampproofing.* Booklet giving specifications on black dampproofings, including Plaster Bond (dampproofing for interiors). Foundation Coat (dampproofing under each filling) and Stone Backing (dampproofing unexposed sides of cut stone). 12 pp. Ill. 5¼ x 7¼ in.

**Wadsworth Howland & Co., Inc.,** Boston, Mass.

**306.** *Bay State Waterproofings.* Contains descriptions of and specifications for use of brick and cement coating, crack filler, below grade waterproofing, steel protective coating, cement floor filler and coating, clear waterproofing. 16 pp. Ill. 8 x 10½ in.

### WATER PURIFICATION

**Graver Corporation,** East Chicago, Ill.

**F523.** *Bulletins* 501 *and* 502. Data on Horizontal Type and Vertical Type Pressure Filters. 21 pp. Ill. 8½ x 11 in. Ask also for typical specification form.

**United States Ozone Co.,** Scottdale, Pa.

**245.** *Bulletin* 37. *Ozone Water Sterilizers.* Contains description of principles and mechanical design, results obtained and specifications covering construction. Complete outline of operation. Capacities from 100 to 1,000 gallons per hour.

**246.** *Bulletin* 39. *Swimming Pools.* Description and application of Ozone apparatus to Swimming Pools. This Bulletin completely covers the purification of swimming pool water and gives unique designs of swimming pool circulating systems.

### WATER SOFTENERS

**The Permutit Company,** 440 Fourth Ave., New York.

**105.** *Permutit (Water Rectification Systems.)* Illustrated booklet. Describes all methods of softening water, including the original Zeolite process. For homes, hotels, apartment houses, swimming pools, laundries and industrial plants. Size 8½ x 11 in. 32 pp.

**Wayne Tank and Pump Company,** Fort Wayne, Ind.

**482.** *Bulletin No.* 1600. This bulletin treats of the value of soft water in the house and describes the Wayne Domestic Water Softening System. 6 pp. Ill. 8¼ x 10½ in.

### WATER SUPPLY—See Pumps

### WEATHER STRIPS

**The Higgin Manufacturing Co.,** 5th and Washington Ave., Newport, Ky.

**354.** *Higgin All Metal Weather Strips.* A booklet of considerable value to architects and builders on the use of weather strips. Ask also for the companion book on "The Reason Why." Each booklet 12 pp. Ill. 6 x 9 in.

### WINDOWS—See Doors and Windows

**Standard Comfort Window Corporation,** 126 Broome St., New York, N. Y.

**405.** A book describing a combination sliding and swinging sash which may be applied to new and old double hung windows. draft-free ventilation; maximum comfort; weather tight; takes all danger out of window washing. 12 pp. Ill. 6 x 9 in.

### WOODWORK

**Hartmann-Sanders Company,** 6 East 39th St., New York, N. Y.

**334.** *Catalog No.* 47. Illustrating Koll's Patent Lock Joint wood stave columns for exterior and interior use. 48 pp. Ill. 7½ x 10 in.

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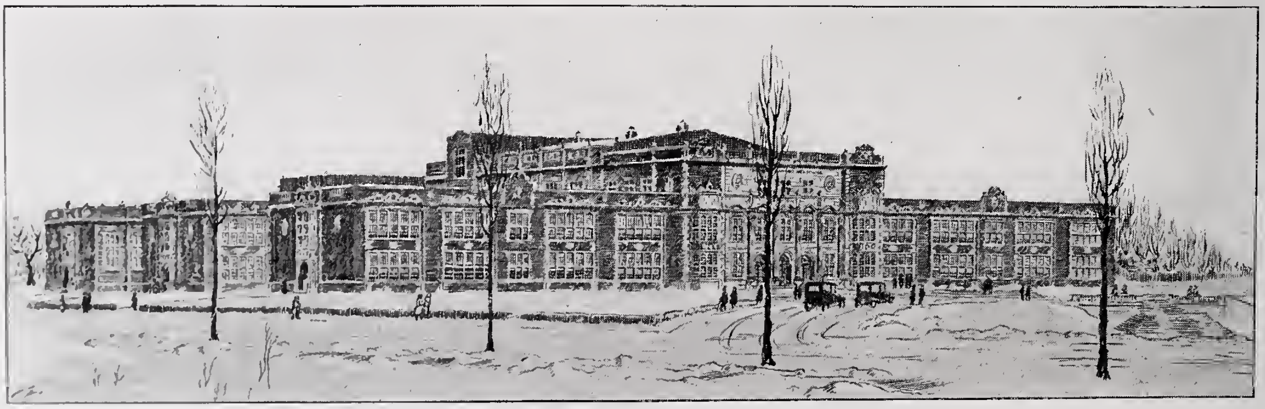

**Theodore Roosevelt High School, Des Moines, Iowa** **Proudfoot, Bird & Rawson, Architects**

The Theodore Roosevelt High School of Des Moines will be fully and permanently protected by Duriron drain lines from its laboratory.

Thus this school is assured of freedom from damage to finish and decorations for all time from corroded, acid-eaten pipe.

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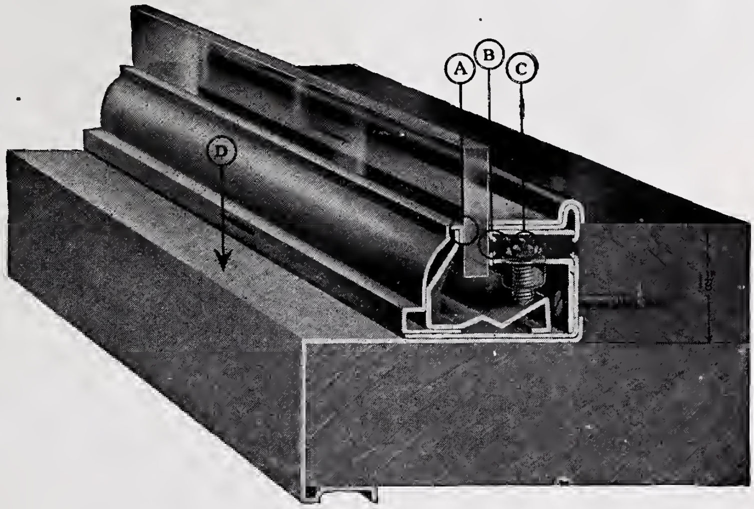
## All Metal Sash, Corner Bars, Division Bars and Self-Adjusting Setting Blocks Used in Store Fronts Must Be Listed by the Underwriters' Laboratories

A is the point where the outer member presses against the glass, when the delicate watch-like turning of the key at C brings the glass automatically into contact with the rabbet of gutter B sliding on the anti-friction Murnane Self-Adjusting Setting Block.



The Sill Covering D extends from the inner side of the rabbet to the lower edge of the face, eliminating joints — perpendicular screws or nails—positively protecting the wood against deterioration, for leakage is impossible.

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**Zouri Drawn Metals Company**

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**Send for literature describing the uses of the Bidet**

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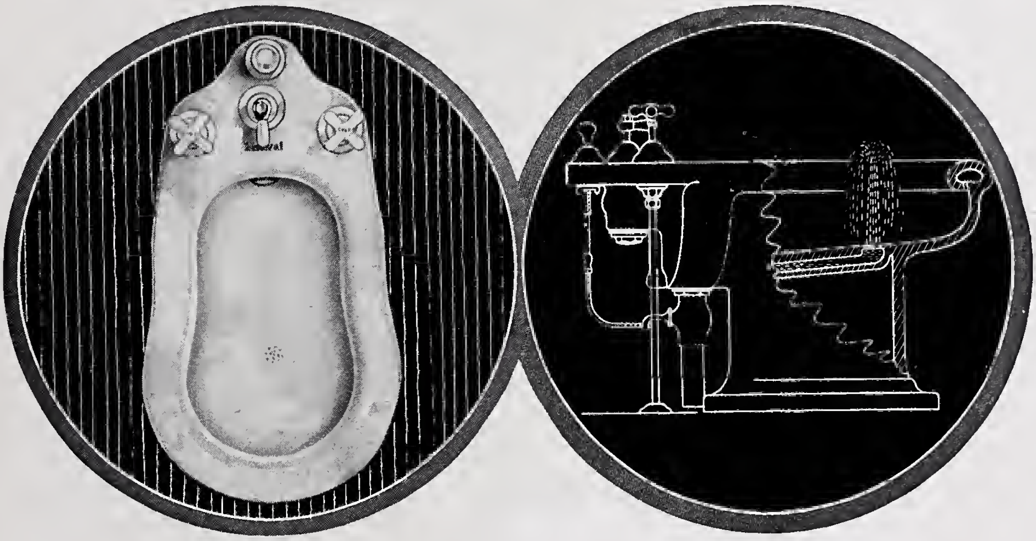

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It has a supply of hot and cold water to either the center douche as shown in the above illustration or to the flushing rim.

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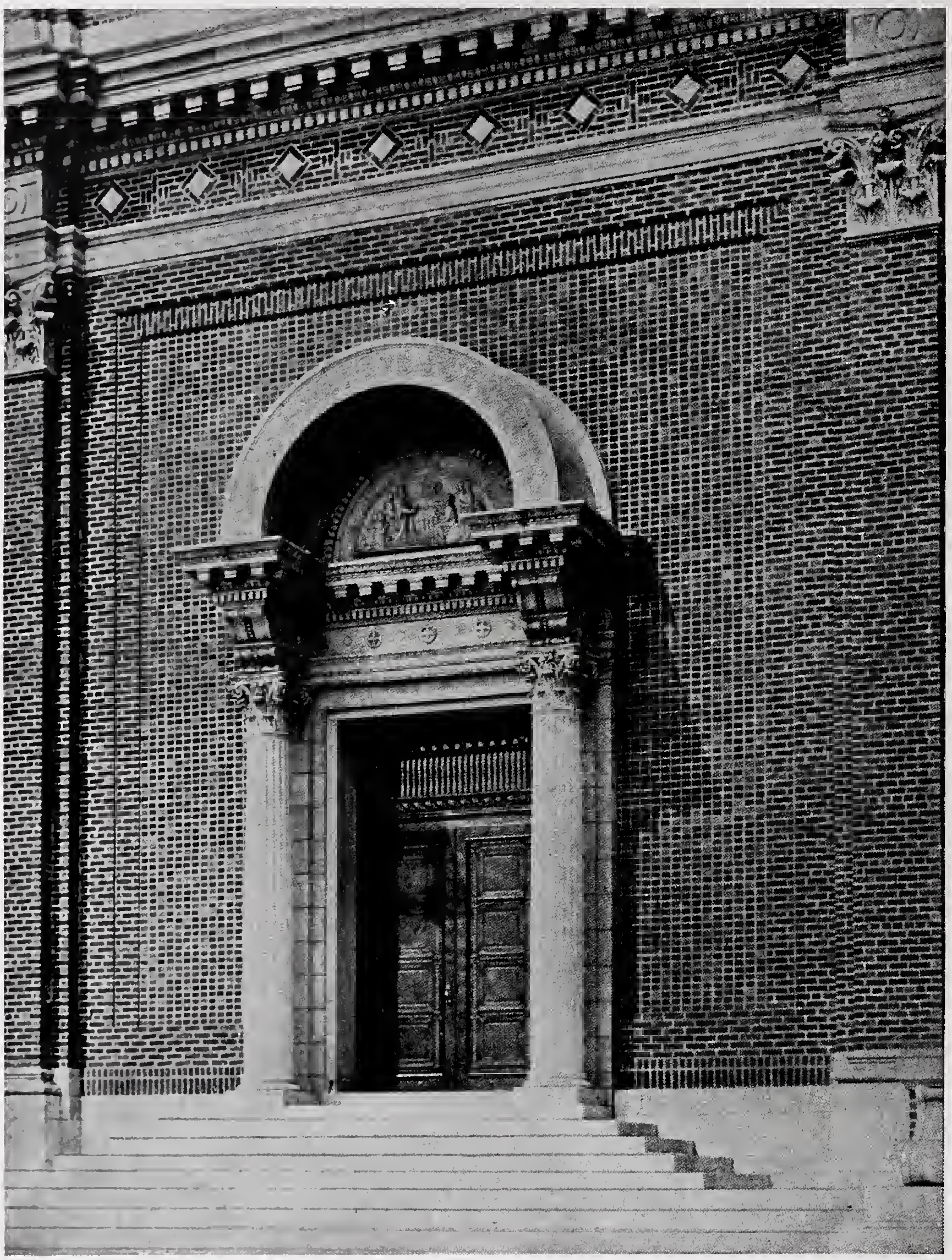

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A veritable piece of mosaic made of the simple brick units. The great recessed panel, in which the canopied door is set, with the delicate line of frieze above reveals a very effective handling of the material.

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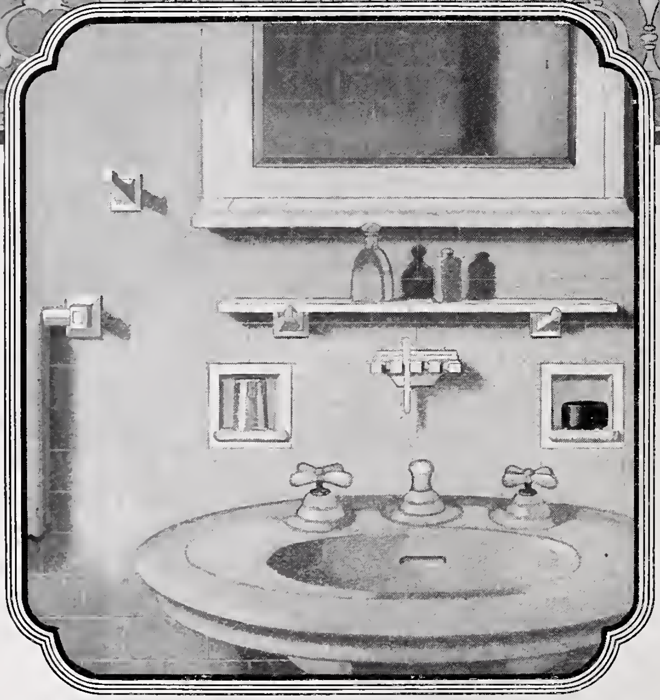

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## ALL METAL
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They do not shrink, swell or warp. They always fit snugly and slide smoothly. They are good to look at and really improve the appearance of a home. They are so light in construction that the full capacity of the window is preserved for ventilation and with reasonable care will last a lifetime.

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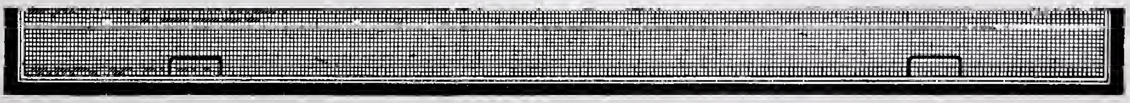

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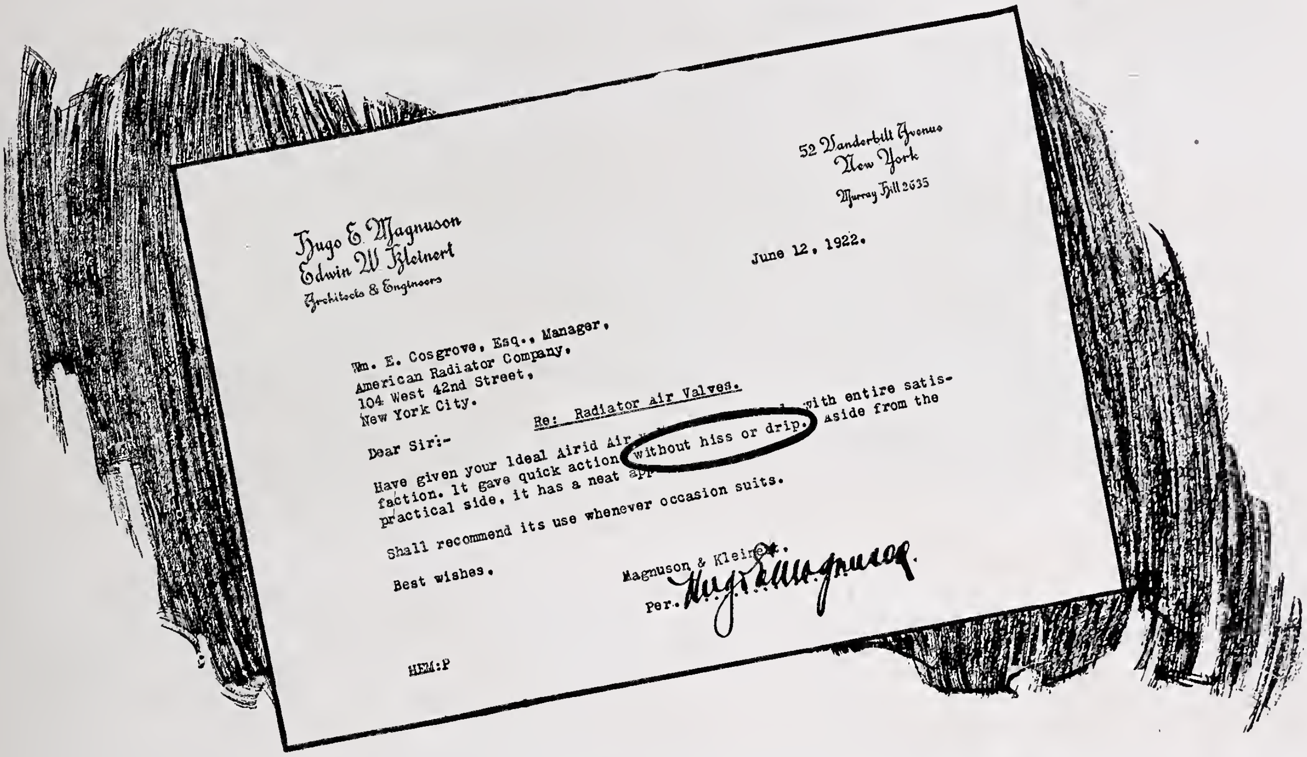

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Hugo E. Magnuson
Edwin W. Kleinert
Architects & Engineers

June 12, 1922.

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Shall recommend its use whenever occasion suits.

Best wishes.

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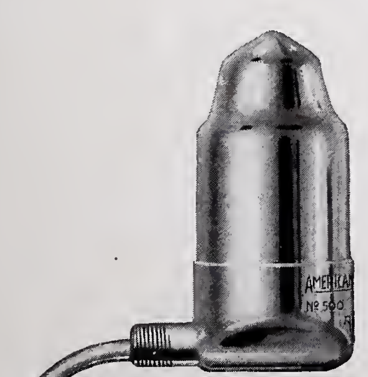

WHEN STEAM rushes into a radiator it pushes air ahead of it. Airid Air-Valves instantly let this clogging air out so that steam can come into every loop of the radiator—without forcing the fire.

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*Rids the radiator of cold air*

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ARCHITECTS who have given careful thought to those items of equipment which go to make a home comfortable and enjoyable are now specifying Lorain-equipped Gas Ranges.

Thousands upon thousands of these wonderful stoves are now in use in schools, universities, churches, apartments and residences.

No other labor-saving device for the home gives more hours of economical and satisfactory service—and, at the same time, leisure—to the housewife.

The Lorain Oven Heat Regulator automatically regulates and controls the heat of the oven, thereby making possible cooking without pot-watching; the canning of fruits and vegetables in the oven, with minimum effort and perfect results; the elimination of cooking failures with the resultant saving of foodstuffs; successful cooking with low and variable pressures; maximum cooking and baking results with minimum gas consumption.

Prices and any desired information sent on request.

*Only these famous stoves are equipped with the Lorain Regulator:*

CLARK JEWEL—
Geo. M. Clark & Co.
Div. Chicago, Ill.

DANGLER—
Dangler Stove Co.
Div., Cleveland, Ohio

DIRECT ACTION—
National Stove Co.
Div., Lorain, Ohio

NEW PROCESS—
New Process Stove Co.
Div., Cleveland, O.

QUICK MEAL—
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Div., St. Louis, Mo.

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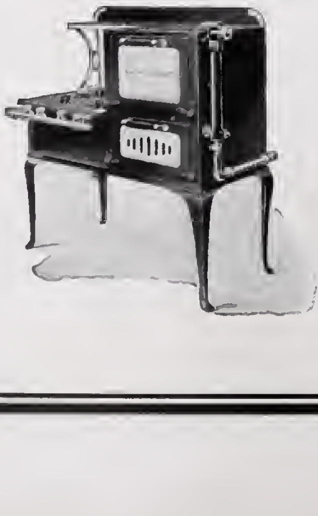
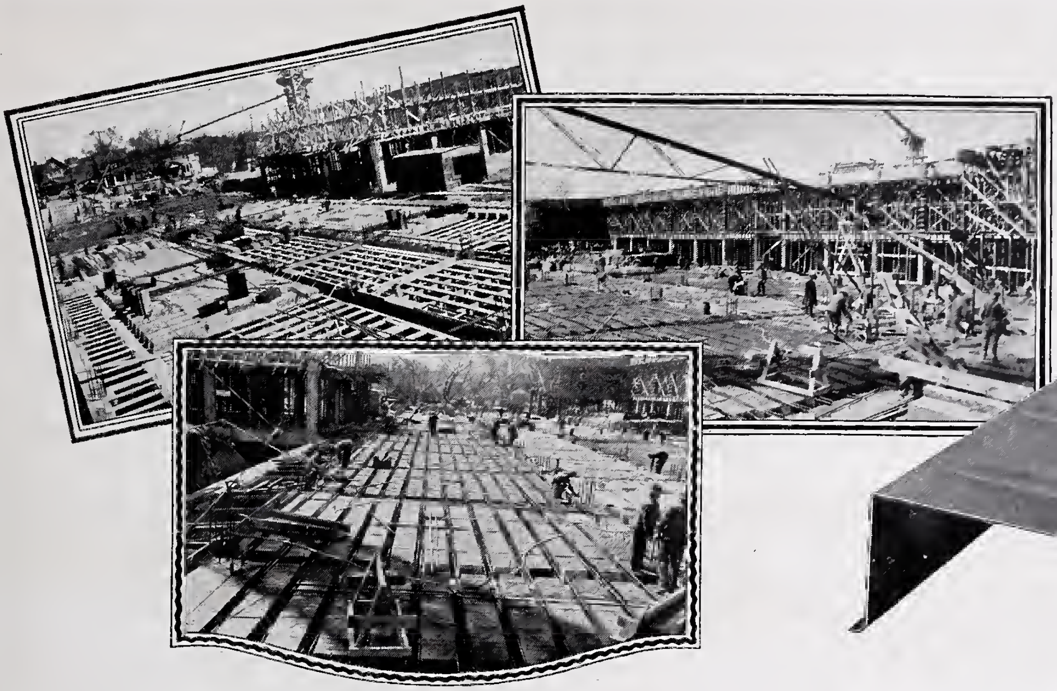
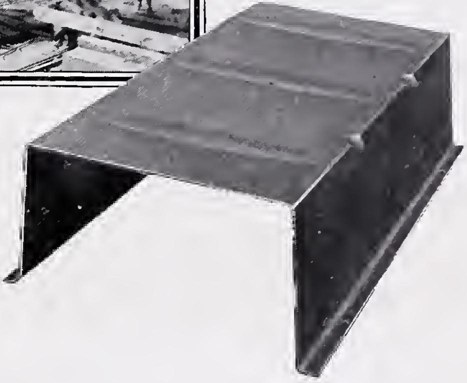
Reliable Stove Co.
Div., Cleveland, Ohio



AMERICAN STOVE COMPANY
*Largest makers of gas ranges in the world*
198 Chouteau Avenue ST. LOUIS, MO.

**LORAIN**
**OVEN HEAT REGULATOR**





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## MEYER STEELFORM CONSTRUCTION

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For Meyer Steelform Construction is a Success. It lead the way in its field, and has maintained its leadership. It excels in architectural adaptability, in speed of construction, in economy of concrete, steel and formwork costs, in dependable service before and during construction.

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F.W. & E.B. Clarke, Architects
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WE HOPE that no architect will hesitate to appeal to us when he has opportunity to install a pipe organ in church, residence, hotel, concert hall or theatre.

Few architects have occasion to specify pipe organs often enough to pay them to make a special study of the problems involved.

We, on the contrary, have done nothing else for seventy-five years. In that time we have had a chance to tackle every kind of problem that different buildings present. Our experience, our advice, our draughting room and our specifications are all at your service.

And in addition, there is our earnest desire to co-operate with you to make the installation a success.

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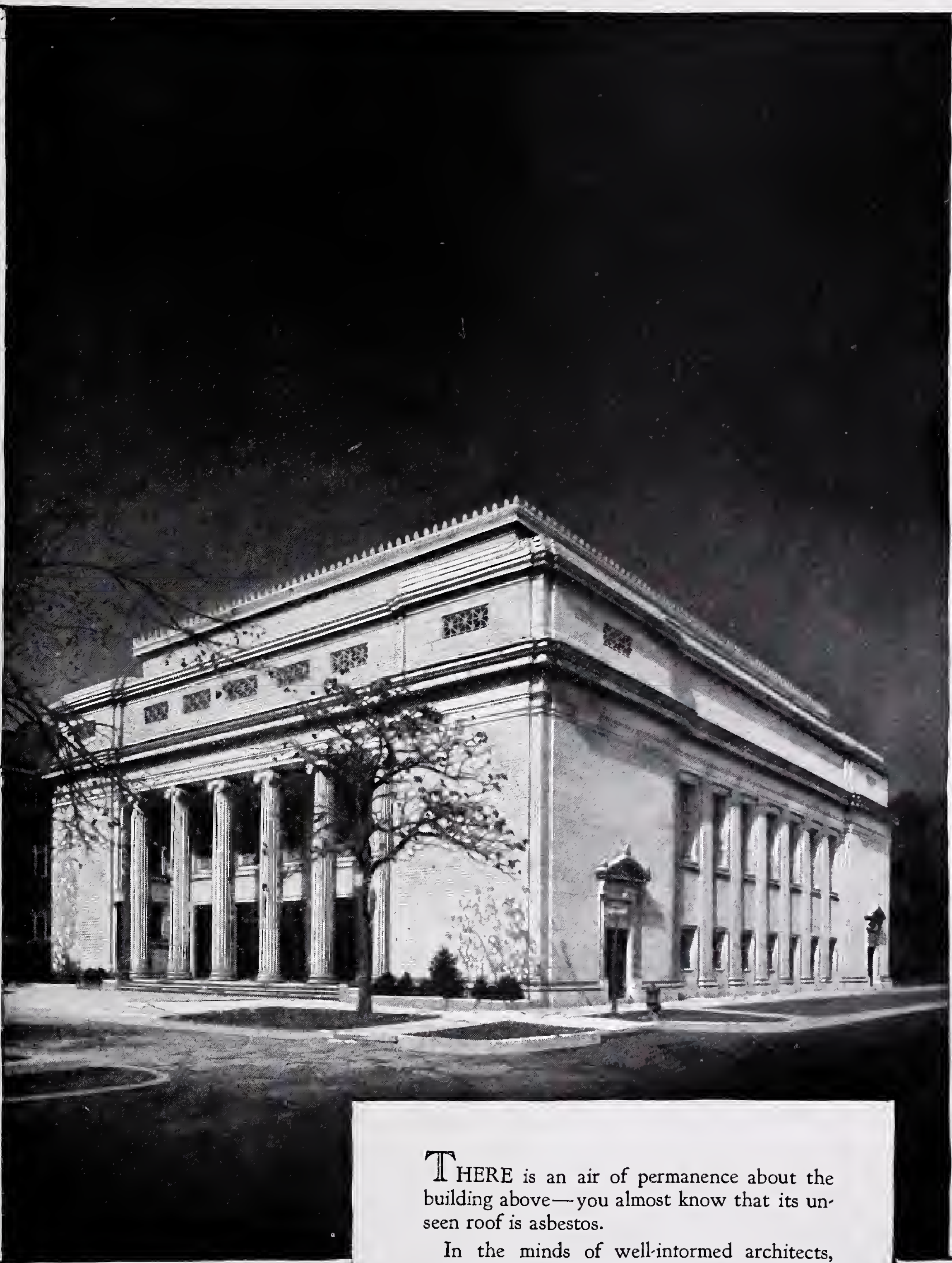

*11th Church of Christ Scientist*
*Chicago, Ill.*
*L. E. Stanhope, Architect*

THERE is an air of permanence about the building above—you almost know that its unseen roof is asbestos.

In the minds of well-informed architects, permanence and Asbestos Roofing are always associated.

Just as the name "Johns-Manville" is always linked in mind with an exceptional service to the profession.

*Branches in all large cities*

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Johns Manville Service
Covers the Continent
*Through*—
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and its allied products
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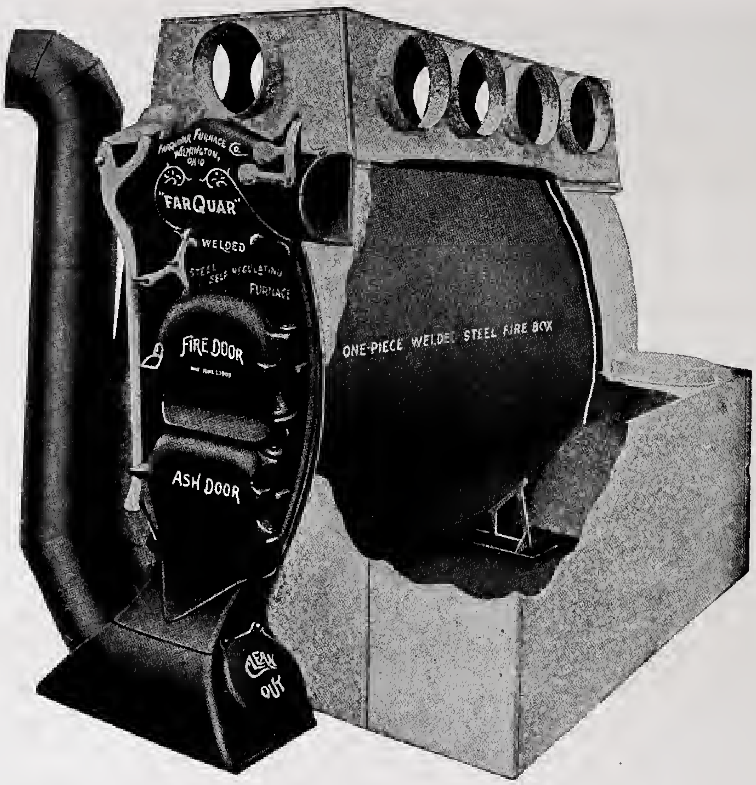

# A Definite Answer to the Heating Question

## An Important Consideration

FarQuar Results can only be attained with FarQuar methods of installation and operation. If you could combine FarQuar capacities with the ordinary furnace, the cost would be practically the same. But you would still be deprived of the benefits of many exclusive features, peculiar to the FarQuar alone, which are essential to the hygienic heating of the home.

The average home owner prefers a heating plant that will operate at the lowest possible cost and with the least attention. Many times, in his desire for such results, he overlooks the very factors essential to their realization.

Practical fuel economy and ease of operation are basic factors with—

**THE FARQUAR SANITARY HEATING AND VENTILATING SYSTEM**

Large grate area gives slow combustion while long fire travel,—with complete utilization of heat from smoke and ashes—gives the fullest measure of heat units per ton of fuel.

And ease of operation has a new meaning when applied to the FarQuar Automatic Control. Actuated by the firebox itself, it completely regulates and controls all doors and drafts, which prevents overheat, protects home and occupants and insures fuel economy.

And always there is the pleasure of having the home heated with pure, fresh, vitalizing air, not saturated with a super-heated and devitalizing atmosphere which is forever inducing drowsiness or "bad air diseases."

FarQuar Heating principles are a challenge to every business and professional man who thinks and reasons for himself. Our booklet, "The Science of House Heating" is especially appreciated by Architects who recognize the importance of its message. A copy will be mailed free for the asking, and you may also feel free to use the assistance of our Engineering Department in working out heating arrangements for any plans you may care to submit.

**Exclusive "FARQUAR" Features and What They Mean**

**Electrically Welded One-Piece Steel Fire-Box** Positively prevents contamination of air by gases or fire poisons.

**Storage Fire-Box** with large grate area insures slow combustion and fuel efficiency.

**Vent and Return System.** Provides a generous supply of gently warmed, pure, fresh air instead of a hot blast of super-heated air.

**Automatic Regulator** actuated by fire-box, completely controls fire, insuring uniform temperature regardless of weather, with surprisingly low fuel consumption.

**The Farquhar Furnace Company,**

**108 FarQuar Bldg., Wilmington, Ohio**

# Ambler Asbestos Shingles

not only protect a property from flying embers of nearby fires, but they keep a fire down. Many a house has been saved from total destruction because its Ambler Asbestos Shingle Roof kept the flames from breaking through.

You serve your clients and the community a good turn by commending Ambler Asbestos Shingles for artistic, permanent, fireproof roofs and Ambler Asbestos Building Lumber for exterior use—half-timbering, paneling, trim—also for fire-doors, etc.

Ambler Linabestos Wallboard is ideal for interior work. Gives ample protection to stairways and hallways, wainscoting, etc. Makes artistic libraries, game-rooms, bathrooms, kitchens, and third-floor rooms. Attractive buff color, but can be painted. Made 48 by 48 and 48 by 96 to fit standard joists.

Specimens and interesting details free of obligation.

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East Intermediate High School, Jackson, Michigan, roofed with GENASCO STANDARD TRINIDAD Built-up Roofing.
Glendon A. Richards Co., Contractors
Claire Allen, Architect

**GENASCO LINE**

- Trinidad Lake Asphalt (For streets and roofs)
- Standard Trinidad Built-up Roofing
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- Genasco Roll Roofing
- Genasco Sealbac Shingles
- Genasco Latite Shingles
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- Genasco Wall Lining
- Iroouois Road-building Machinery

## *No. 9—How to determine the waterproofing efficiency of any built-up roof*

The first test of any roofing is—Will it keep out the rain? The second is—How long will it stay waterproof and last?

Waterproofing efficiency in a built-up roofing is determined—*not by weight or thickness*—but by the kind of waterproofing material used.

GENASCO STANDARD TRINIDAD—the smooth-surface built-up roofing—is waterproofed with TRINIDAD LAKE ASPHALT—a world-old, ages-seasoned material.

Mineral-surfaced built-up roofs are waterproofed with coal tar, oil residuum or some other manufactured bituminous compound.

Just compare the difference!

GENASCO STANDARD TRINIDAD is built in 6 layers—weighs only 150 pounds per square—and has a waterproofing efficiency of *85% per square.*

Mineral-surfaced built-up roofs are built in 12 layers—weigh 625 pounds per square—*and have a waterproofing efficiency of only 30% per square.*

That's why GENASCO STANDARD TRINIDAD is the lowest-cost, built-up roofing on the market—why it stays waterproof and lasts as long as a building stands.

Detailed information and complete specifications for applying GENASCO STANDARD TRINIDAD will be sent to architects on request.

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THE BARBER ASPHALT COMPANY
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*Asphaltic Roofing, Flooring, Paints and Allied Protective Products*

# SPECIFY STANLEY GARAGE HARDWARE IN SETS

STANLEY
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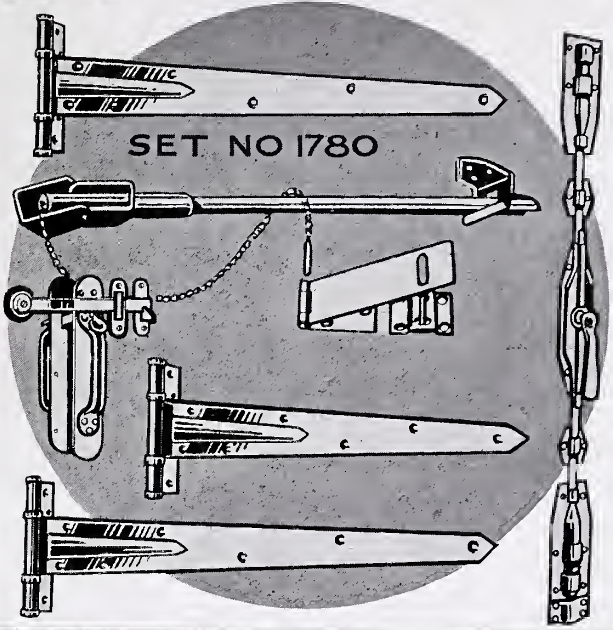

## *A set for every type of Garage*

### And the right kind of a Set for the right kind of Garage!

There is nothing more incongruous than hardware which is out of harmony with an architect's plans. Realizing this we have designed many sets of Garage hardware so as to be able to match practically every type of Garage, and thus satisfy both architect and client. Each set is complete with everything, all balanced in size and weight.

The quality of hardware on a garage also determines the kind and length of service the garage will give.

Set No. 1780 is recommended for brick and stucco garages. It includes Stanley Ball Bearing Hinges, 36″ long at top and bottom panels; 24″ long at center panel; Garage Door Holder (cushion type), Cremone Bolt, which locks door at top and bottom at one operation; and, an Extra Heavy Padlock Hasp.

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**May we send you our "Catalog AA-15," which illustrates the plans of 8 types of garages, and suggests the right hardware for each type?**

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## The Stanley Works

Main Offices and Plant
NEW BRITAIN, CONN.

New York Chicago San Francisco Los Angeles Seattle

# New, interesting handbook for architects on remarkable mortar cement sent you free

Contains comprehensive and easily available technical data regarding most modern, efficient and economical brick and stone mortar.

Describes manufacturing methods in detail. Explains causes of difficulties that attend old-fashioned mortar practices.

Points the way to better, more economical and more enduring masonry with particular reference to unusual adaptability to architectural requirements.

Experiences of leading contractors are cited. Exhaustive tests of bricks and mortars are reported. Practical and technical demonstrations are reviewed. Contains simple directions for the utmost in successful and economical masonry.

This booklet with its handy reference tab will fit your data file. As a reference authority for continued use it will be found invaluable.

A request on your letterhead will bring it to your desk—free of charge.

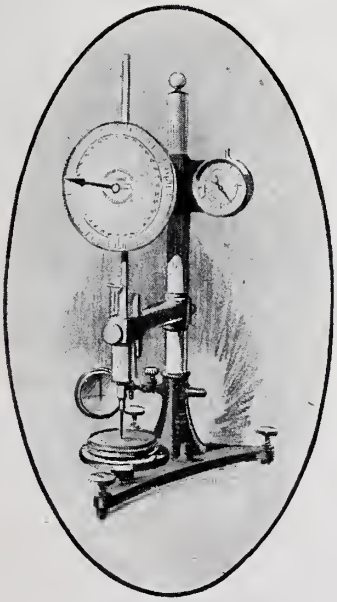
LOUISVILLE CEMENT COMPANY, *Incorporated*, Louisville, Ky.

**BRIXMENT**

# The Wear is *in* a Roof—not *on* it

A roof doesn't wear *down;* it wears *out.* The durability of surface waterproofing depends upon inner strength—which in inferior roofing breaks down under constant exposure to air, to heat, to the stress of wind and storm.

That is why the Richardson Company lays such emphasis upon the importance of Richardson felt as the key material in Viskalt Membrane Roofs. Felt manufacture is an art that requires specialized skill in the selection of stock, and thorough knowledge of the delicate processes by which a perfectly uniform fabric is produced.



**Tests That Establish Uniformity**

*The rigid tests to which Viskalt is subjected in Richardson laboratories assure uniformity above all things. Every gallon of Viskalt has uniform flash point, uniform penetration, uniform viscosity. The test for penetration is illustrated above.*

## Viskalt
### MEMBRANE ROOFS

No other manufacturer has had the experience of the Richardson Company as felt makers—for Richardson felt has been a standard product for roofing purposes since 1868. It is tough, durable, heavy—uniformly made by experienced workmen, from uniformly fine materials. It has exceptionally high tensile and bursting strength. Every square fully meets all the specifications an architect lays down for this type of roof.

The binding and waterproofing agent in this roof is Viskalt Compound, a scientifically blended product of Richardson's own refineries, which owes its unusual waterproofing properties to the fact that it is 99 per cent pure bitumen.

Viskalt is highly adhesive and cohesive—a solid that is pliant under stress, yet non-volatile at sun temperatures. It will not crack or break up in the coldest weather; will not evaporate or run under extreme heat.

Because of these properties Viskalt Roofs can be laid by the membraneous system on either steep or flat surfaces, and will "stay put." When Viskalt is used, it is not necessary to surface with gravel—an added weight and expense with no added waterproofing or wearing qualities.

When you specify a Viskalt Membrane Roof, you are calling for products that you can depend upon to meet every roofing requirement.

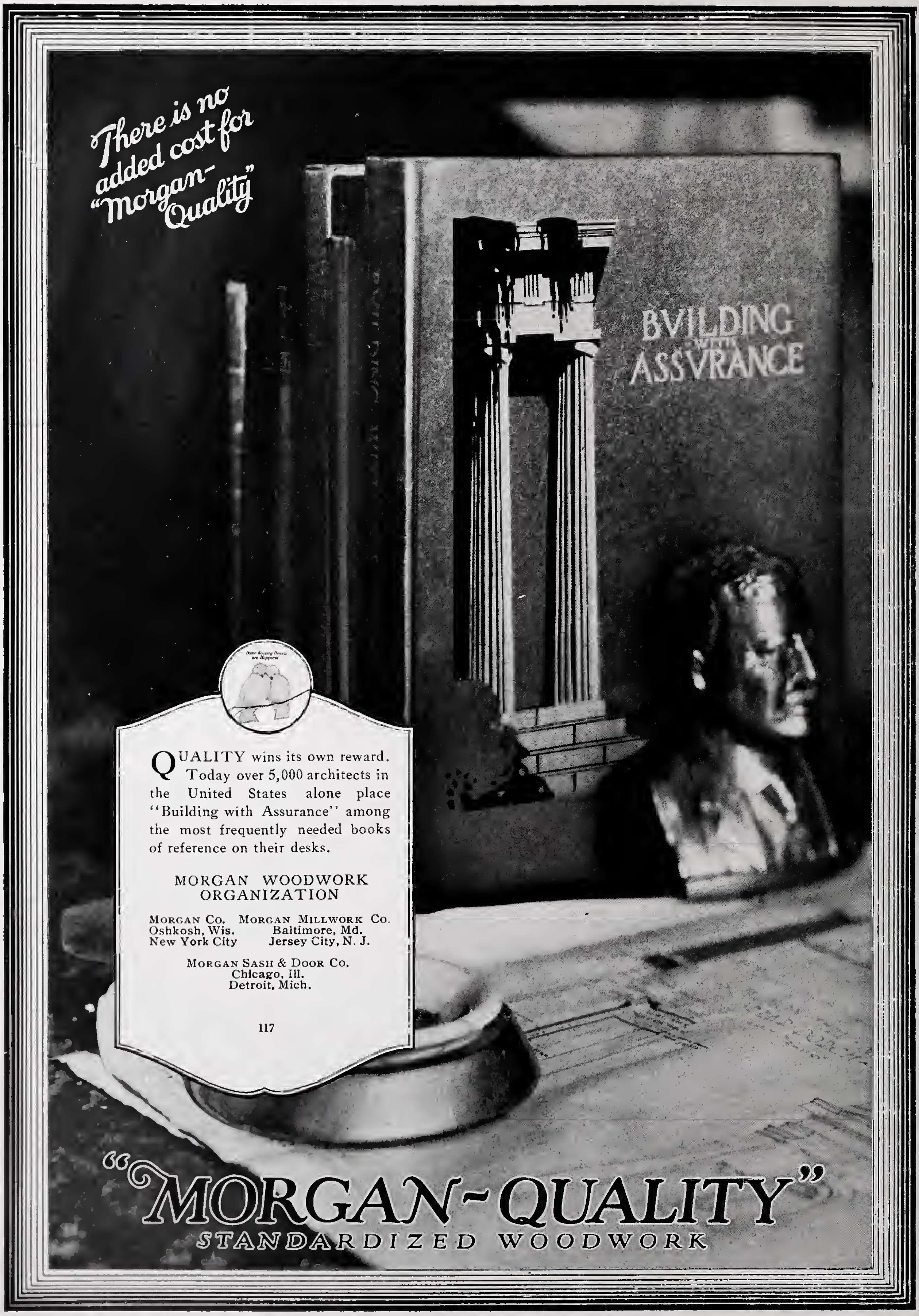
Complete specifications will be sent on request—or may be found in Sweet's Catalogue ——.

*The complete line of Viskalt products includes Viskalt Waterproofing for foundations, tunnels, etc.; Viskalt Fibrated Cement for damp-proofing retaining walls, embankments and similar structures; Viskalt Saniflex, a sound-deadening and insulating material; Viskalt Paints and Cements for many other damp-proofing purposes.*

RICHARDSON
FLEXATILE HOUSE TOPS 1868
Product
Address Dept. P

The RICHARDSON COMPANY

Melrose Park, (Chicago) Illinois Lockland, (Cincinnati) Ohio New Orleans, Louisiana



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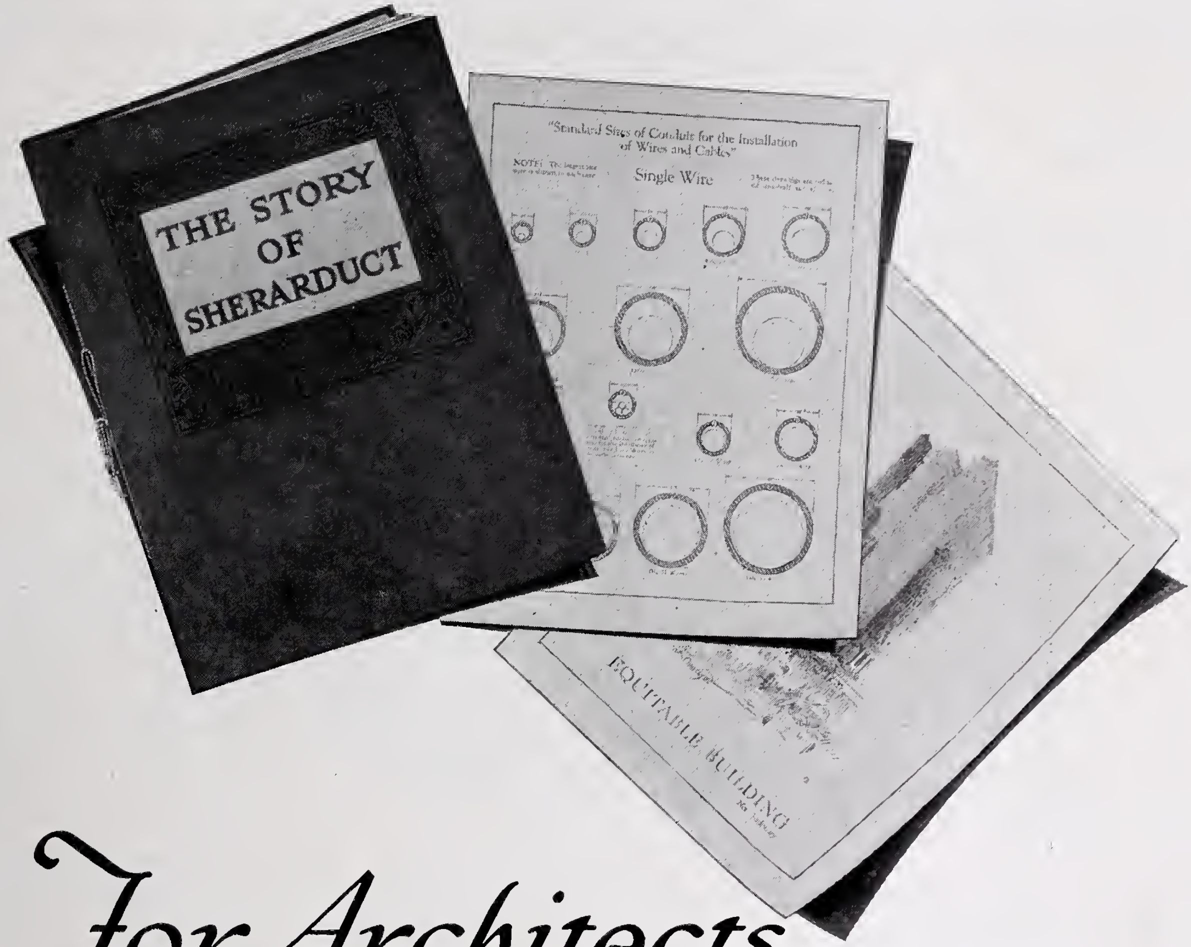
"MORGAN-QUALITY"
STANDARDIZED WOODWORK


THE STORY OF SHERARDUCT
"Standard Sizes of Conduit for the Installation of Wires and Cables"
Single Wire
EQUITABLE BUILDING

# *For Architects*

"THE Story of Sherarduct" has been prepared solely for the use of Architects and Engineers. The Standard Sizes of Conduits for the Installation of Wires and Cables are given to assist in Specification Work. Full page illustrations of many of the country's most prominent buildings in which Sherarduct is installed are rendered in pencil in a manner that will prove of exceptional interest to draughtsmen.

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National Metal Molding Co.
**1217 Fulton Building**
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# The Remarkable Bonding Strength of Kellastone

THE disappointment frequently experienced in ordinary stucco construction is often due to the lack of affinity between the stucco and the surface to which it is applied. The natural result is cracking, falling off and eventual complete deterioration.

**Kellastone** forms a perfect bond with any of the construction surfaces in common use. It sticks so tightly that its removal or separation from any surface over which it has been applied is accomplished only with extreme difficulty. After it has been permitted to thoroughly set on an ordinary brick surface, it is difficult to remove without chipping the face of the brick.

Such remarkable bonding strength is conducive of the practically indestructible character of **Kellastone**, developing the longevity of service for which it has become famous on all types of construction.

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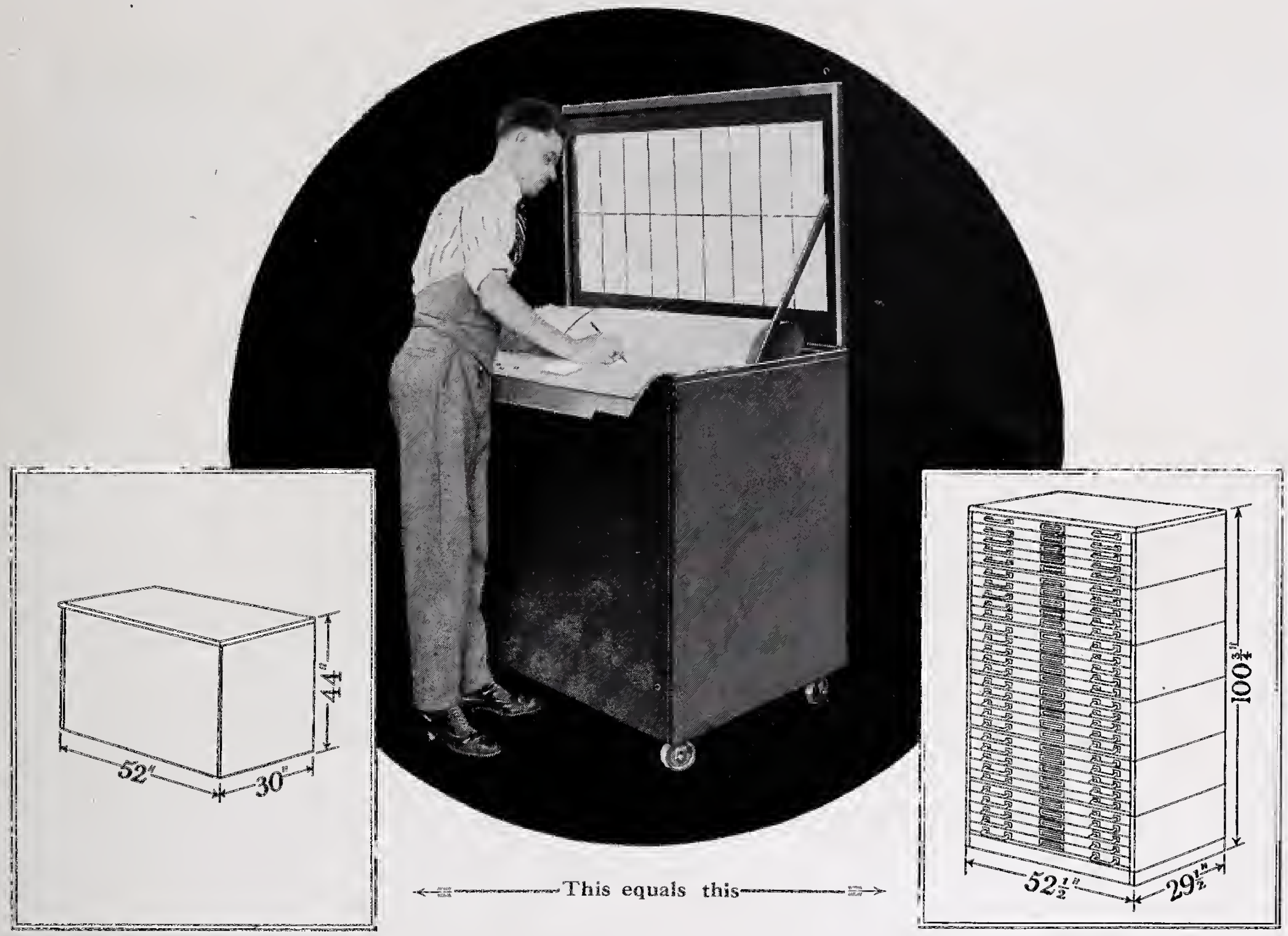
KELLASTONE
IMPERISHABLE STUCCO



*Art Metal Steel Planfile*

*Stack of wooden plan drawers*

# Uses least space—
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JAMESTOWN, NEW YORK

*World's largest makers of steel office equipment*

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***Equitable and Creditable to Architect, Owner and Contractor***

The Standard Contract Documents of the American Institute of Architects are now on sale by dealers in office and drafting supplies in all of the large cities of the country.

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| **Letter of Acceptance of Subcontractor's Proposal** | **.03** |
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Complete trial set prepaid for thirty cents in stamps.

These Documents have received the full approval of the Institute, through its Conventions, Board of Directors and Officers. They are the outcome of continuous work of many years by a Standing Committee on Contracts and Specifications. This Committee, comprising some of the ablest American architects, was assisted by the Institute's forty Chapters; advised by eminent legal specialists in contract law, and aided by representatives of the leading construction interests in the United States.

The forms have been officially approved by the National Association of Builders' Exchanges, the National Association of Master Plumbers, the National Association of Sheet Metal Contractors of the United States, The National Electrical Contractors' Association of the United States, the National Association of Marble Dealers, the Building Granite Quarries Association, the Building Trades Employers Association of the City of New York, and the Heating and Piping Contractors National Association.

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All of the above Contract forms and Circulars may be obtained singly or in lots from local dealers. If your dealer cannot supply you promptly and at the above prices, send your order and his name to the Executive Secretary, A. I. A., The Octagon House, Washington, D. C. Sample documents mailed upon receipt of stamps. Remittances may be by check, money-order, cash or stamps.

All orders filled on the day received. Transportation prepaid on those amounting to $1.00 net or more.

**The adoption and consistent use of these contract forms is recommended to the Architect who wishes his office to be known for its thorough, incisive business methods.**

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Office Building of John Hancock Mutual Life Insurance Co.
Parker, Thomas & Rice, Architects L. P. Soule & Sons, Contractors

IN THIS BUILDING DAHLSTROM DOORS AND TRIM ARE CORRECTLY PLACED: ABOVE ALL COMPETITION.

Originators and largest manufacturers of Commercial Hollow Metal Interior Trim and Doors.

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New York Office
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Detroit Office
1331 Dime Bank Building

Chicago Office
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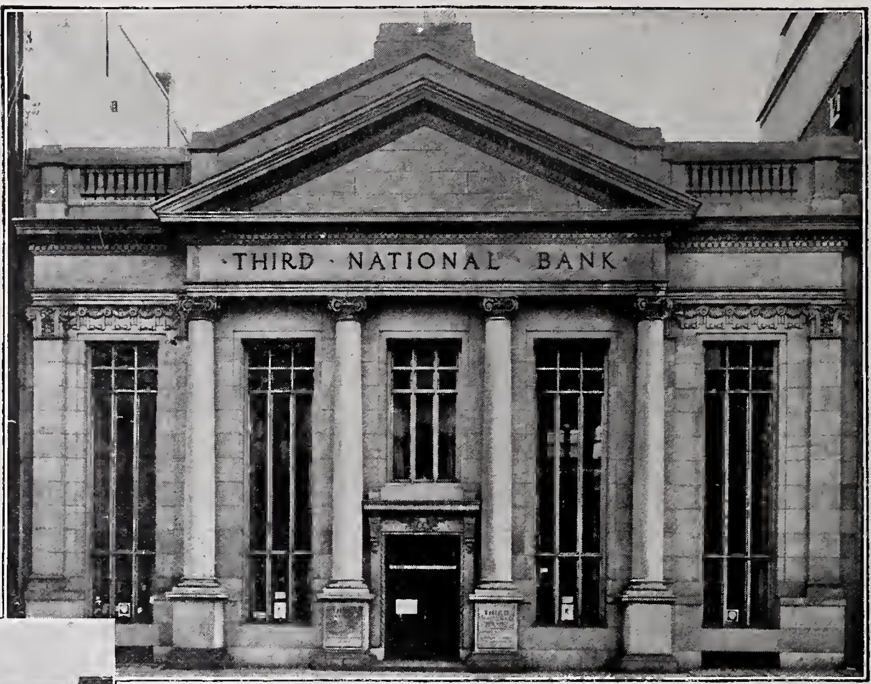
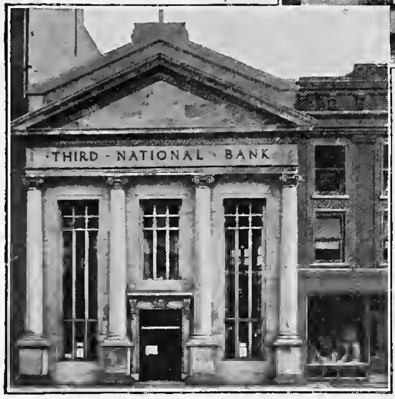
*Representatives In All Principal Cities*



*Third National Bank Building, Scranton, Pa. After being remodeled*
*Edward Langley, Architect for the Alteration*



*Third National Bank Building, Scranton, Pa.*
*Before being remodeled*
*Dockworth Brothers, Architects*

*Note: When this building was previously illustrated in the advertising of this Association, the name of Architect for original building was, in error, given as Architect for the Alteration also*

INDIANA LIMESTONE

*Booklets on Indiana Limestone will be mailed on request*

# When Planning Buildings Prepare for Future Expansion

When the owners of the Third National Bank Building at Scranton found it practicable to remodel and enlarge their Indiana Limestone building, they purchased the adjacent site, moved the old building to the center of it and added two wings to the old front.

The illustration shows the old and new buildings. The original bank front is that central portion of the present front, composed of four columns and the pediment above. The present building is a tribute to the ingenuity of the Architect who so effectively remodeled the old building, utilizing all of the stone.

Architects and owners who select Indiana Limestone do so with the assurance that the quarries from which this stone is obtained will be in operation years hence, producing the same stone, when alterations or additions to the original structure are required. This fact is of the utmost importance when recommending and selecting a building stone.

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Box 765, Bedford, Indiana
Metropolitan Service Bureau, 622 Marbridge Building, New York City

# INDIANA LIMESTONE

THE NATION'S BUILDING STONE

**Kawneer**
SOLID COPPER
**STORE FRONTS**

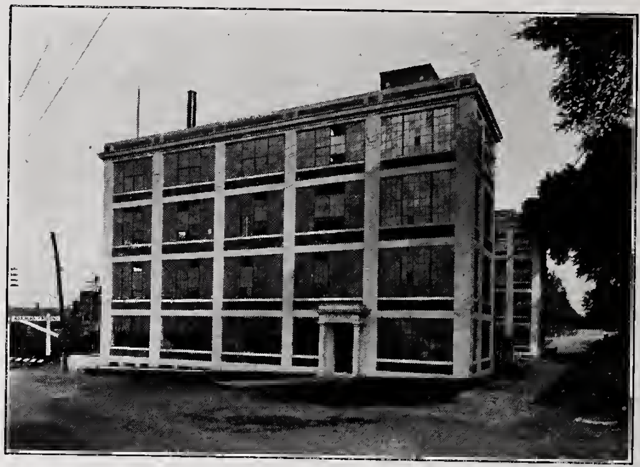
ARCHITECTS find in Kawneer construction properly designed copper mouldings to fit every store front requirement. Whether for an imposing entrance for a large merchandise emporium or for the smaller shops, you will find just the right moulding in our wide assortment of stock and special members. This is one of the reasons why Kawneer Store Front construction has been specified and used in more than 150,000 of the most successful store fronts on the busiest streets of the nation.

Our new complete catalog gives full information and details about Kawneer construction. May we send a copy for your files?

THE
Kawneer
COMPANY
NILES, MICHIGAN

## ABERTHAW SAYS:

"This is one of the most attractive structures we have ever built, and the appearance is due in no small measure to the strong even color of the brickwork which the writer understands was treated with two coats of DEHYDRATINE No. 2.



Rumford Printing Company Building, Concord, New Hampshire
Aberthaw Constr. Co., Gen. Contr.

## DEHYDRATINE No. 2

Transparent Liquid Waterproofing

Produces a waterproof wall, and preserves the original fine texture of the masonry.

The U. S. Bureau of Standards tests prove that DEHYDRATINE No. 2 ranks first in waterproofing value.

## A. C. HORN COMPANY

*Makers of Chemical Compounds for Structural Conservation*

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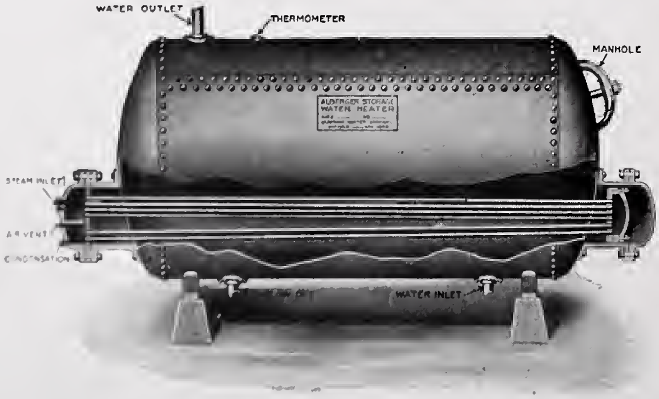

*Owing to the high efficiency* and higher rate of transmission, leading engineers and architects everywhere are specifying Alberger.

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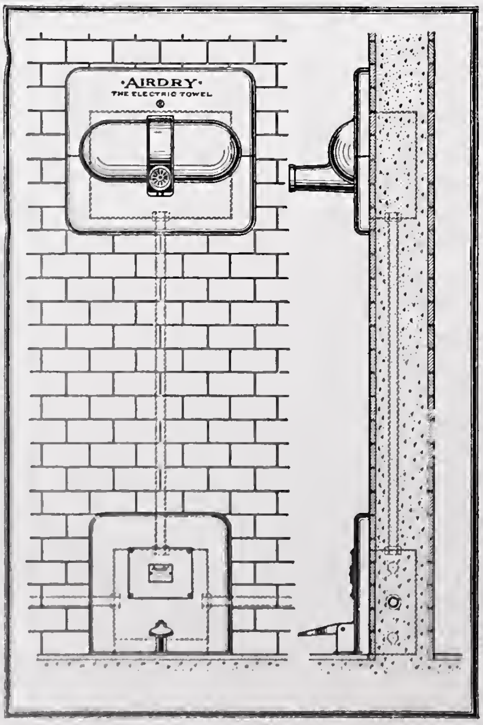

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*For additional information, see*
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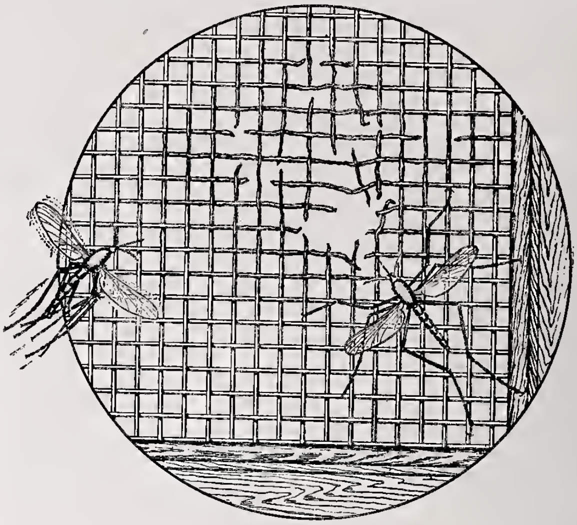

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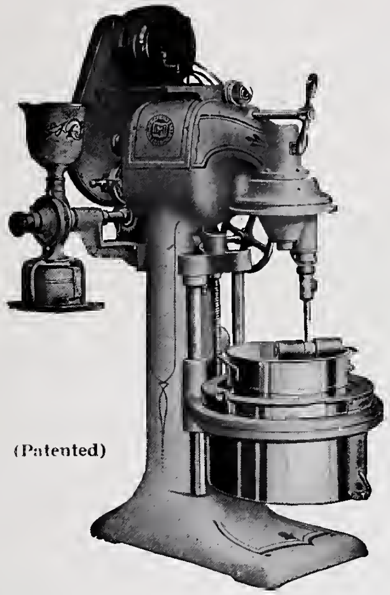

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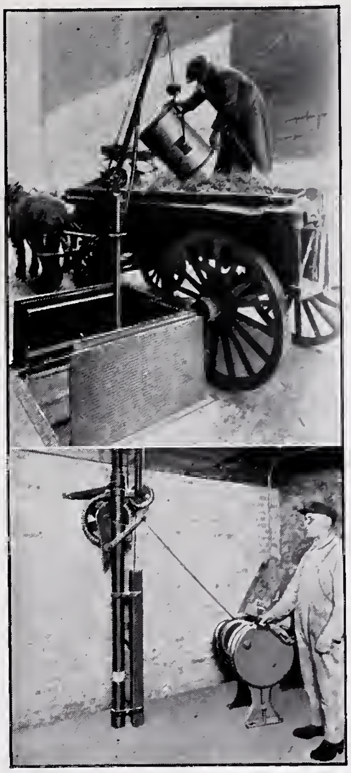

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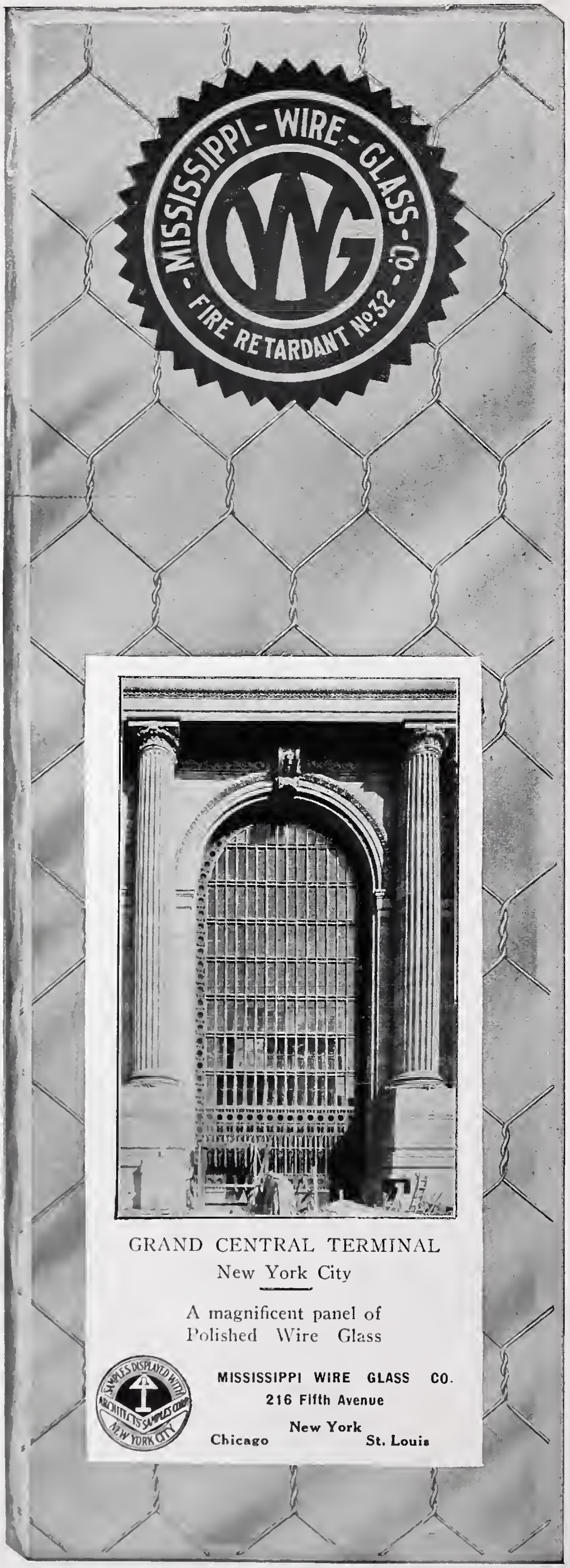
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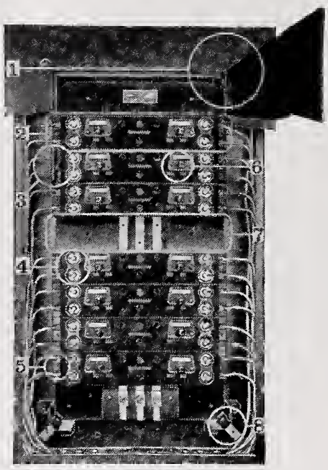

The *"T-P"* fills every requirement for a branch switch panel board.

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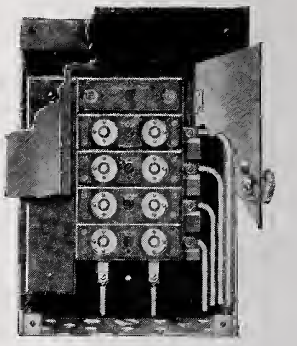

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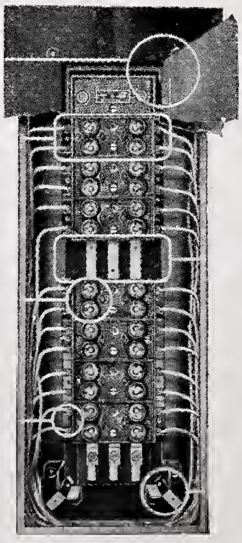

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***especially suited to showcase lighting, lighting from small coves and Polaralite signs***

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*For general specifications see Sweet's Architectural Catalogue, Page 458, 16th Edition; Page 389, 15th Edition.*

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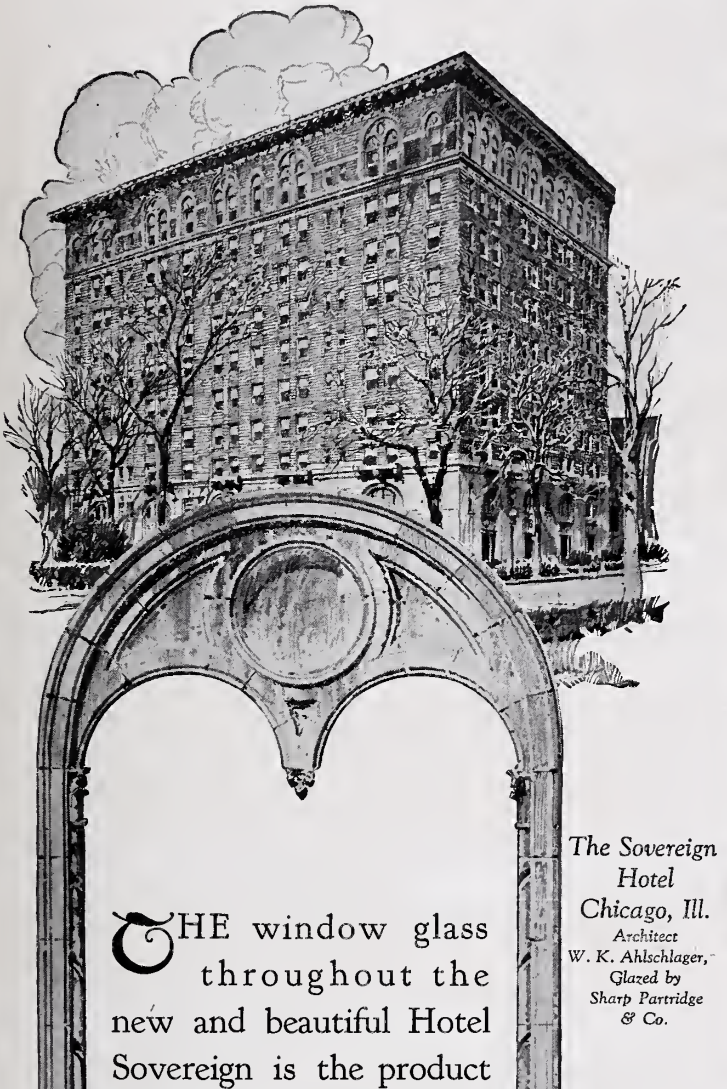

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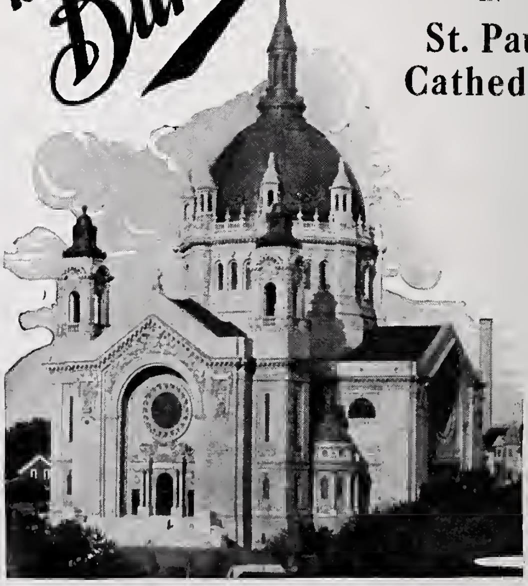

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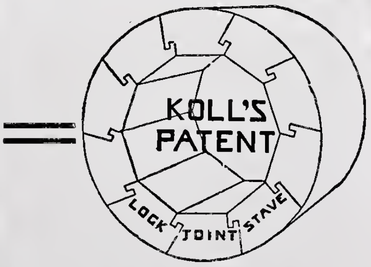

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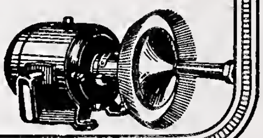

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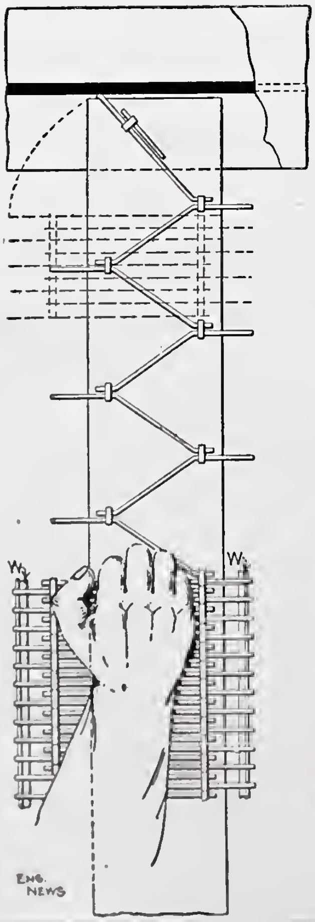

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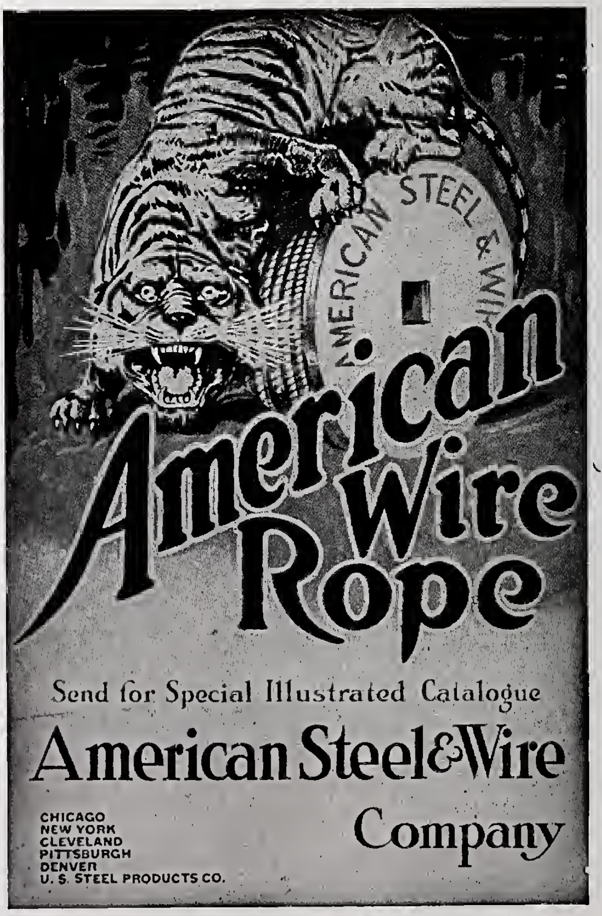

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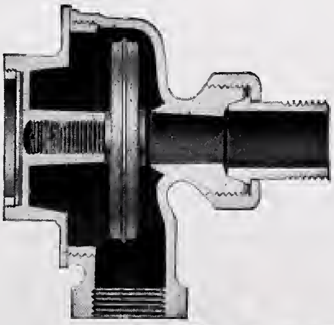

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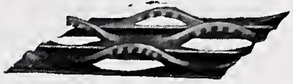

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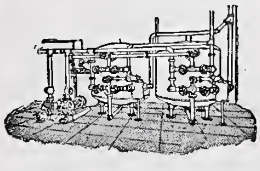

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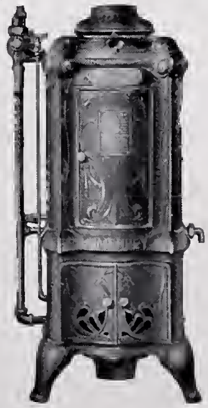

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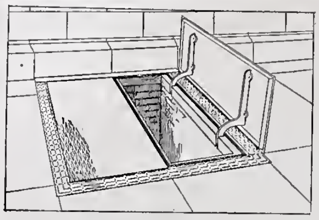

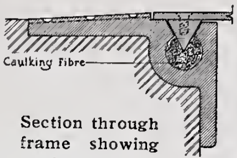

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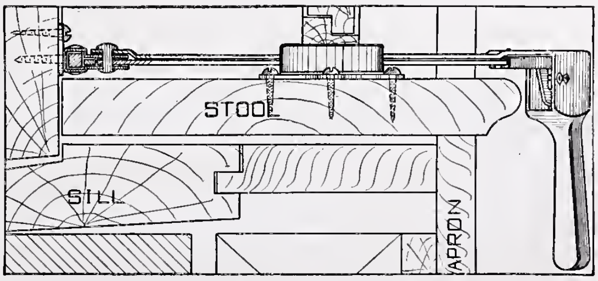

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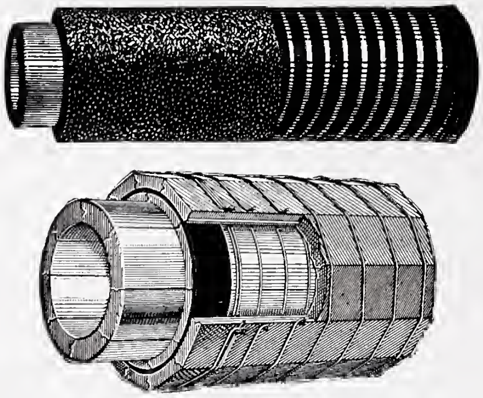

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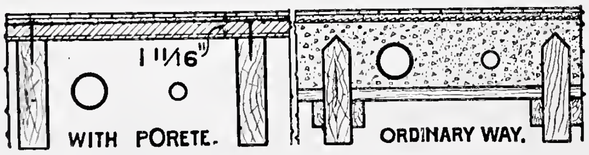

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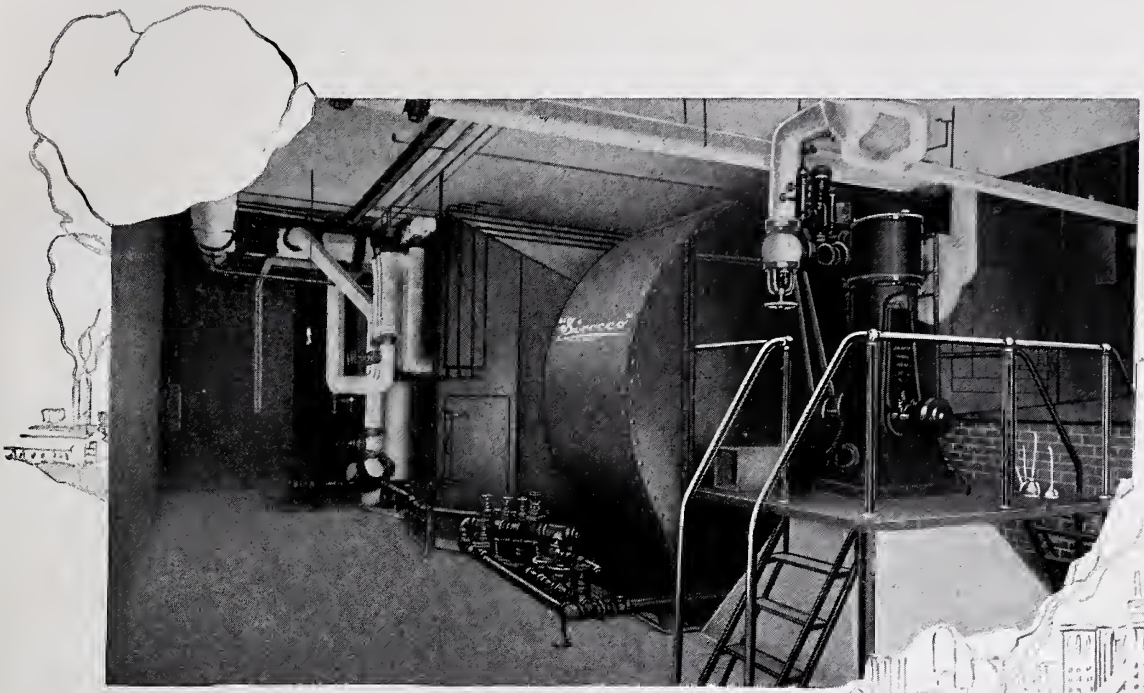

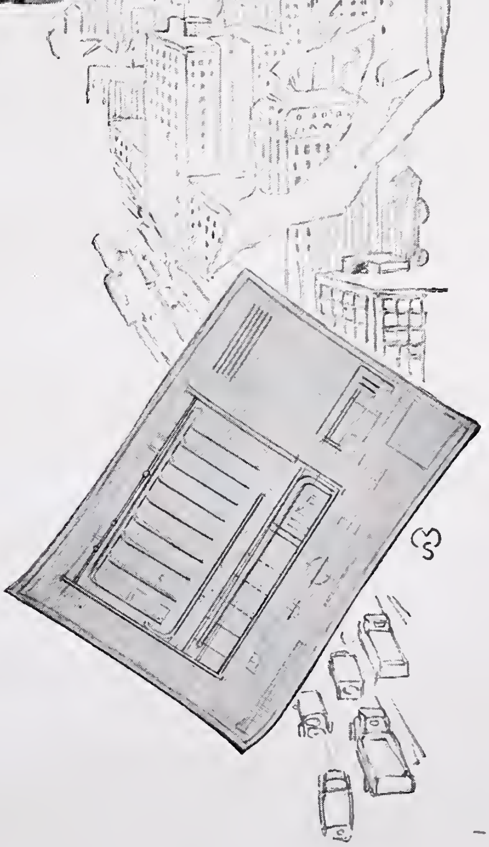

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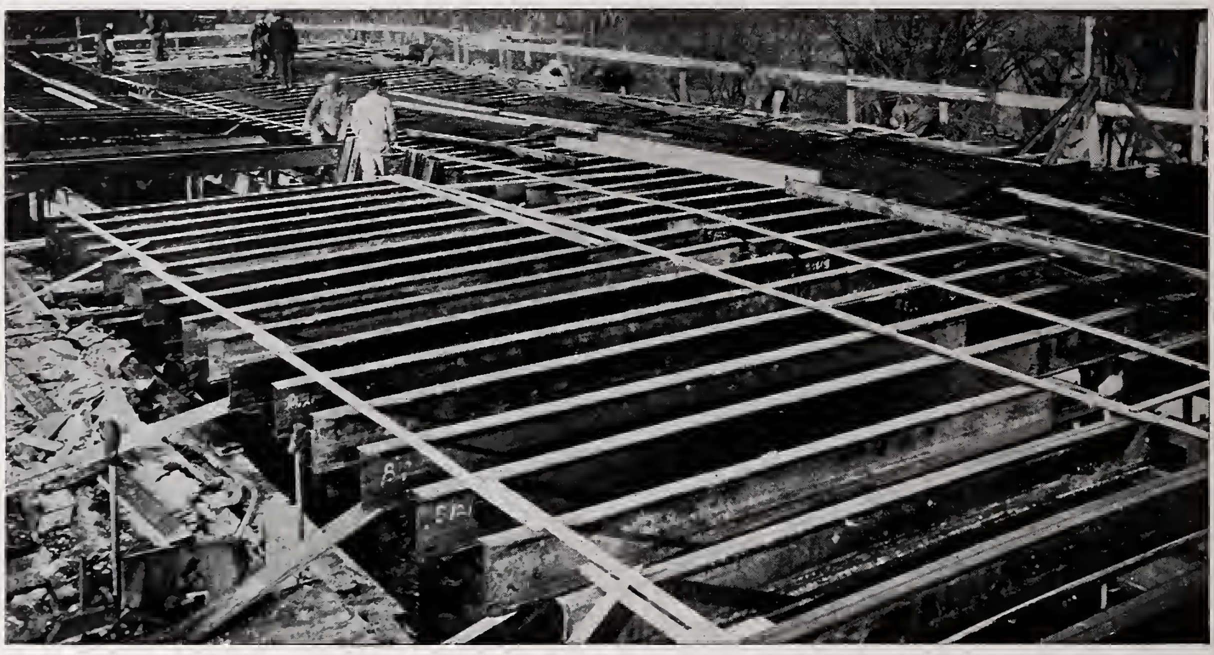

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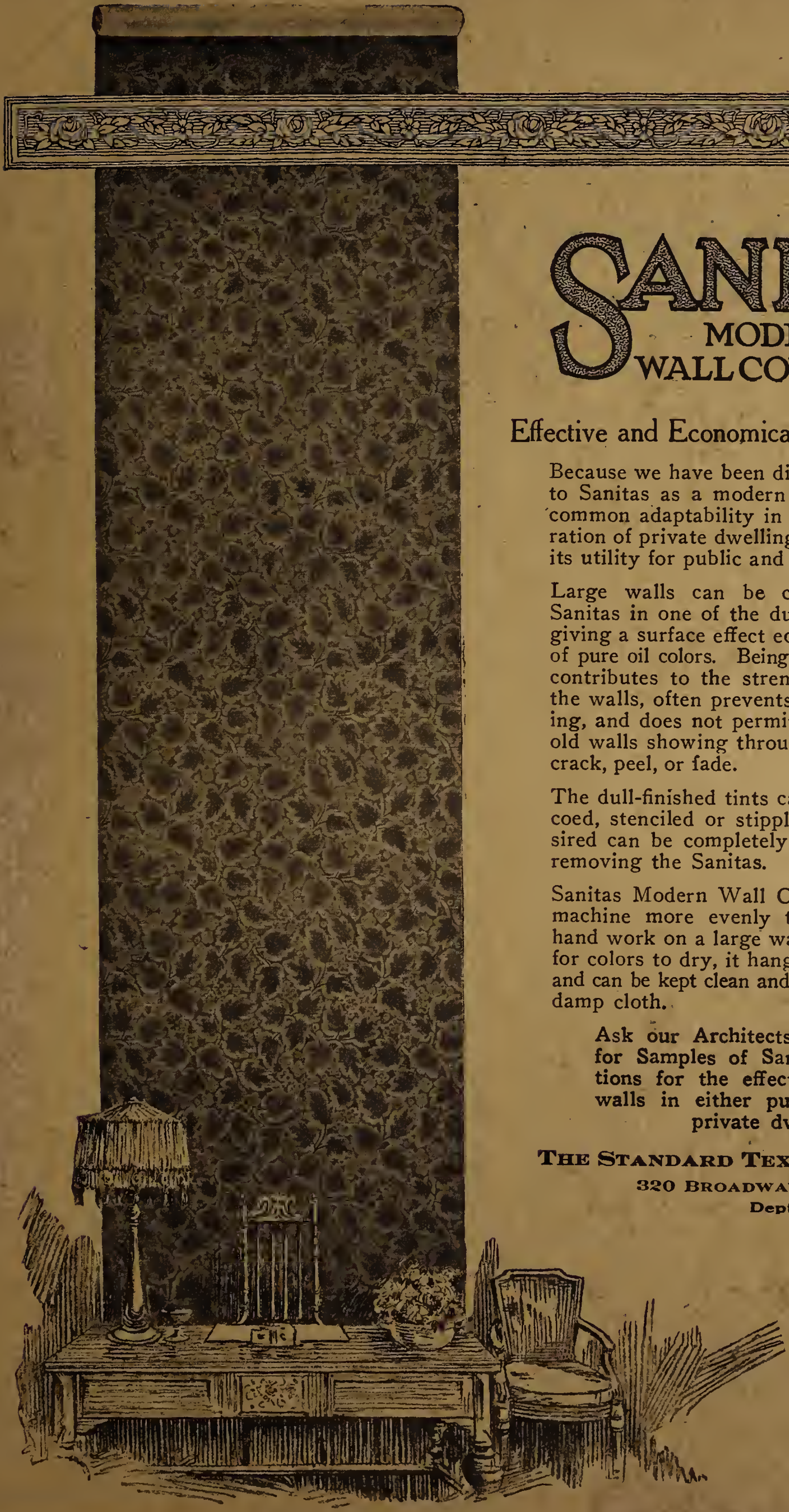

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